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RESEARCH ARTICLE

REACTIVE HYPERPLASTIC GINGIVAL LESIONS: A CASE SERIES WITH CLINICO-HISTOPATHOLOGICAL CORRELATION AND MANAGEMENT

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Abstract

Introduction: Gingival overgrowths encompass a broad spectrum of non-neoplastic lesions that are commonly encountered in routine dental practice. These lesions often present as localized gingival enlargements and may clinically mimic true neoplastic proliferations, leading to diagnostic challenges. Most of these overgrowths represent reactive hyperplastic responses to persistent local irritants such as plaque, calculus, ill-fitting restorations, sharp tooth surface, or trauma. Despite their benign nature, the clinical presentation may raise concern due to rapid growth, bleeding, or interference with mastication and oral hygiene.Therefore,a thorough clinical assessment supported by histopat hological evaluation is essential for accurate diagnosis and appropriate treatment planning

Objective: To present and analyze five histopathologically confirmed cases of reactive gingival overgrowths, highlighting the diagnostic and management challenges associated with these lesions.

Methodology: Five patients with gingival enlargements were evaluated clinically,radiographically,and histopathologically.All patients underwe nt Phase I therapy, followed by surgical excision of the lesions, which were submitted for histopathological analysis to confirm the diagnosis.

Conclusion: Accurate identification and complete surgical removal of reactive lesions, along with elimination of etiological factors, are essential to prevent recurrence.

Introduction:-

Gingival proliferations represent a heterogeneous group of exophytic lesions that originate from the gingiva, often manifesting clinically as localized or generalized enlargement. The term "epulis" is frequently applied to such overgrowths, although it remains non-specific and requires histopathological evaluation for precise diagnosis.[1]Many

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of these lesions are reactive in nature, representing non-neoplastic proliferations that share clinical similarities with benign neoplastic lesions. Typically, asymptomatic, they are considered exaggerated tissue responses to chronic local irritation or trauma, often associated with dental plaque, hormonal influences, or systemic factors.[2]

These gingival overgrowths can significantly impact patients by interfering with speech, mastication, oral hygiene maintenance, and esthetics.[3] Therefore, prompt recognition and accurate diagnosis are paramount for successful management. Histopathologic examination plays a critical role in differentiating among the varied reactive lesions, which include pyogenic granuloma, pyogenic granuloma with ossification, fibroepithelial polyp/traumatic fibroma and squamous hyperplasia with chronic inflammation.

This case series presents five cases of localized gingival overgrowths, comprising pyogenic granuloma, pyogenic granuloma with foci of ossification, fibroepithelial polyp, and squamous hyperplasia with chronic inflammation. The cases highlight diverse histopathological presentations, emphasizing the necessity of thorough clinical examination, histological assessment, and patient compliance in treatment and follow-up. Accurate diagnosis followed by meticulous surgical management and sustained postoperative maintenance are essential to achieve favorable outcomes and prevent recurrence.[4]

Case presentation:-

Table 1: Case Presentation

Cases	Clinical features	Radiographic findings	Histopathological findings	Diagnosis	Follow up
Case 1	56 year-olds / Male Toothbrush trauma Location – 43,42,41, 15mm*16mm, Round with irregular border, Reddish pink, Soft in consistency, Pedunculated (Figure 1(A.))	Moderate horizontal bone loss (Figure 1(B.))	Parakeratinized epithelium over connective tissue with mixed inflammatory cells, budding capillaries, and endothelial proliferation separated by fibrous septae (Figure 1(C.))	Pyogenic Granuloma	After eight months, there was no recurrence.
Case 2	62 year-olds / Female Toothbrush trauma Location – 22,23, 9mm*11mm, Oval with regular margin, Reddish pink in color, Soft in consistency, Pedunculated (Figure 2(A.))	Mild crestal bone loss (Figure 2(B.))	Similar to Case 1 with added hemorrhage and focal ossification seen in connective tissue. (Figure 2(C.))	Pyogenic Granuloma with few foci of ossification	After seven months, there was no recurrence.
Case 3	26 year-olds / Female Toothbrush trauma, Location – 42,43, 8mm*8mm, Round with regular border, Reddish pink in color, Firm in consistency, Pedunculated (Figure 3(A.))	No bone loss was present (Figure 3(B.))	Hyperplastic epithelium over fibrocollagenous stroma with chronic inflammation (Figure 3(C.))	Fibroepithelial Polyp	After six months, there was no recurrence.
Case 4	17 year-olds / Male, Toothbrush trauma, Location – 11,21, Red Erythematous, Soft in consistency (Figure 4(A.))	No Bone loss was present (Figure 4(B.))	Hyperplastic squamous epithelium with mixed inflammatory cells, vascular proliferation, and congestion (Figure 4(C.))	Squamous hyperplasia with chronic active inflammation	After six months, there was no recurrence.

Case 5	13 year-olds / Female Poor oral hygeine Location – 32,33, 12mm*8mm, Round with smooth border, Reddish pink in color, Soft in consistency, Pedunculated (Figure 5 (A.))	Mild crestal bone loss (Figure 5 (B.))	Parakeratinized epithelium over connective tissue with mixed inflammatory cells, budding capillaries, and endothelial proliferation separated by fibrous septae (Figure 5 (C.))	Pyogenic Granuloma	Eleven months later, the lesion reappeared which was again treated.
Case 5A	13 year-old / Female Location – 32,33, 17mm*8mm, Oval with irregular border, Reddish pink in color, Soft in consistency, Pedunculated (Figure 6(A.))	Mild crestal bone loss (Figure 6(B.))	Parakeratotic stratified squamous epithelium, showing acanthosis and proliferation. Underlying fibrocellular connective tissue shows mature collagen bundles with mild to intense infiltration of mixed inflammatory cells and dilated and engorged blood vessels. Extravasated RBCs are also seen. (Figure 6(C))	Irritational Fibroma	After nine months, lesion reappeared which was again treated.
Case 5B	14 year-old / Female Location – 32,33, 14mm*10mm, oval with smooth border, Reddish pink in color, Soft in consistency, Pedunculated (Figure 7(A.))	Mild crestal bone loss (Figure 7(B.))	Hyperplastic stratified squamous epithelium, ulcerated in some areas. Underlying intenselyinflamed fibrocellular connective tissue mass shows plasma cell-rich granulation tissue and dilated blood vessels. (Figure 7(C.))	Fibroepithelial hyperplasia with plasma cell-rich granulation tissue	After 2 months, there was no recurrence, further follow up is required.

Case 1:
A 56-year-old male patient reported with a soft, reddish-pink gingival enlargement localized in the mandibular anterior region involving teeth 43, 42, and 41, with a duration of 10 days (Figure 1(A.)). The patient disclosed a history of trauma attributed to aggressive tooth brushing in the affected area. Clinically, the lesion demonstrated a gradual increase in size but remained asymptomatic. Initial management included scaling and root planing, followed by periodontal flap surgery.

The excised tissue was submitted for histopathological evaluation, which confirmed the diagnosis of pyogenic granuloma, characterized by a proliferation of numerous budding capillaries within a fibrovascular stroma. Postoperative care included detailed oral hygiene instructions, specifically emphasizing proper toothbrushing technique and the use of a soft-bristled toothbrush. Sutures were removed at the 1-week follow-up visit. On follow-up after six months, no recurrence of the lesion was observed.

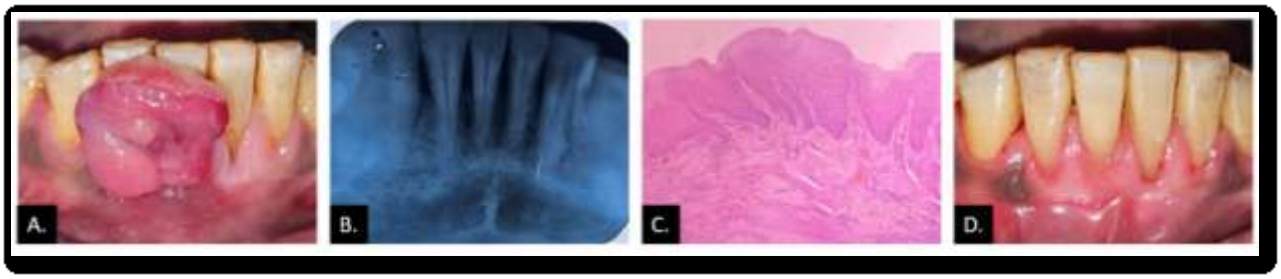

Figure 1 : Case 1. (A.) Preoperative clinical picture depicting gingival overgrowth w.r.t 41 and 42, (B.) Radiograph examination, (C.) Histopathological examination, (D.) Follow-up at 4 weeks post excision

Case 2:
A 62-year-old female patient presented with a soft, reddish-pink gingival swelling in the maxillary left anterior region, involving teeth 22 and 23 (Figure 2 (A.)). The patient reported a history of toothbrush trauma to that area. The lesion had been progressively increasing in size over the past 10 days, without any associated pain or discomfort. Following Phase-I periodontal therapy, an excisional biopsy was performed.

The excised tissue was submitted for histopathological examination, which confirmed the diagnosis of pyogenic granuloma exhibiting areas of ossification. Histologically, foci of ossification were noted within the connective tissue stroma. Postoperative care included reinforcement of oral hygiene practices, with emphasis on appropriate brushing techniques.

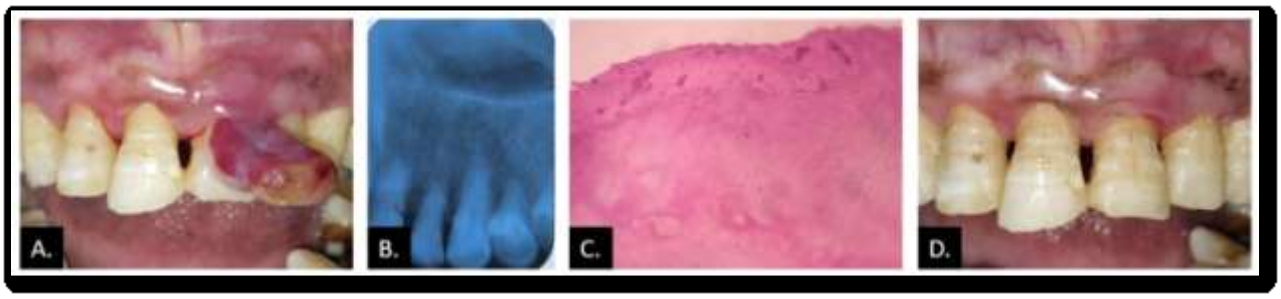

Figure 2 : Case 2. (A.) Preoperative clinical picture depicting gingival overgrowth w.r.t 21,22 (B.) Radiograph examination, (C.) Histopathological examination, (D.) Follow-up at 4 weeks post excision

Case 3:
A 26-year-old female reported with a firm, reddish gingival overgrowth localized to the mandibular right anterior region involving teeth 42 and 43, persisting for approximately six months. The patient attributed the lesion to trauma from improper toothbrushing. Clinically, the overgrowth was non-tender and well-demarcated, with no radiographic evidence of underlying alveolar bone loss.

Surgical excision of the lesion was performed, and the excised tissue was submitted for histopathological analysis. Microscopic examination revealed features consistent with a fibroepithelial polyp, characterized by hyperplastic stratified squamous epithelium overlaying a fibrocollagenous connective tissue stroma with areas of chronic inflammatory cell infiltration. Postoperative care included detailed oral hygiene instructions, with emphasis on proper brushing technique to prevent recurrence.

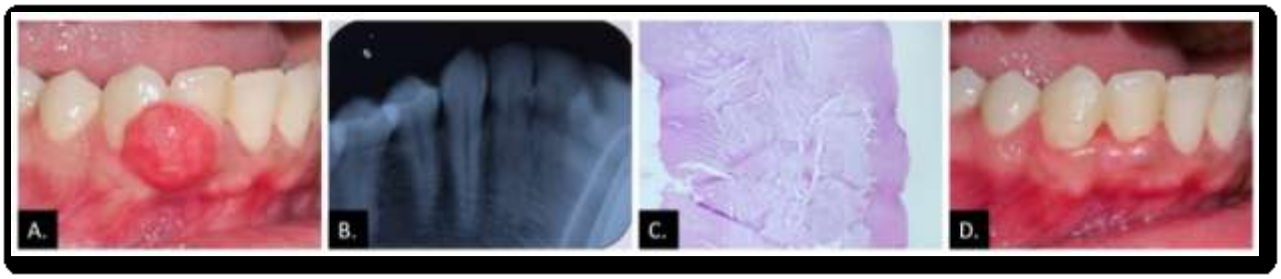

Figure 3 : Case 3. (A.) Preoperative clinical picture depicting gingival overgrowth w.r.t 42,43 (B.) Radiograph examination, (C.) Histopathological examination, (D.) Follow-up at 4 weeks post excision

Case 4:

A 17-year-old male presented with a gingival enlargement in the anterior region, since past four months. The patient reported a history of trauma due to toothbrush trauma. Clinically, the lesion appeared soft in consistency, asymptomatic, and without any signs of bleeding or discomfort (Figure 4 (A.)). Radiographic assessment revealed no evidence of alveolar bone involvement. After Phase 1 therapy, an excisional biopsy was undertaken, and the excised tissue was subjected to histopathological examination. Microscopic evaluation revealed squamous epithelial hyperplasia accompanied by a chronically inflamed connective tissue stroma with features of active inflammation. The patient was provided with comprehensive oral hygiene instructions, including education on atraumatic brushing methods to prevent recurrence.

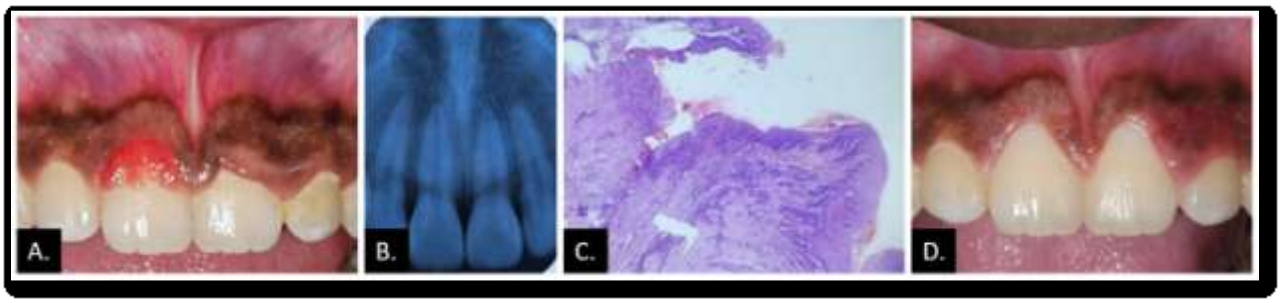

Figure 4: Case 4. (A.) Preoperative clinical picture depicting gingival overgrowth w.r.t 11 (B.) Radiograph examination, (C.) Histopathological examination, (D.) Follow-up at 4 weeks post excision

Case 5:

A 13-year-old female presented with a gingival swelling in the lower left anterior region (32, 33) that had developed over six months. The lesion was pedunculated, reddish-pink, soft in consistency, and measured approximately 12 mm × 8 mm. It had a smooth border and was asymptomatic. After scaling and root planning, an excisional biopsy was performed and histopathological examination revealed the lesion as a Pyogenic Granuloma**.**

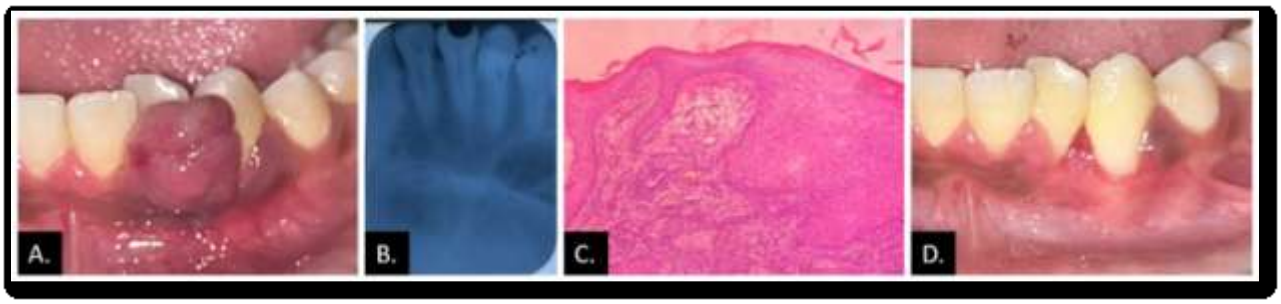

Figure 5 : Case 5. (A.) Preoperative clinical picture depicting gingival overgrowth w.r.t 32,33 (B.) Radiograph examination, (C.) Histopathological examination, (D.) Follow-up at 4 weeks post excision

Case 5A:
After a period of ten months, the patient (Case 5) presented with a recurrent lesion at the same anatomical site. The recurrent growth had increased in size, measuring approximately 17 mm × 8 mm, and exhibited an irregular peripheral contour. Clinical features were similar to the previous lesion, though with a more irregular presentation. After phase 1 therapy, an excisional biopsy was performed. The lesion was diagnosed as an Irritational Fibroma**.**

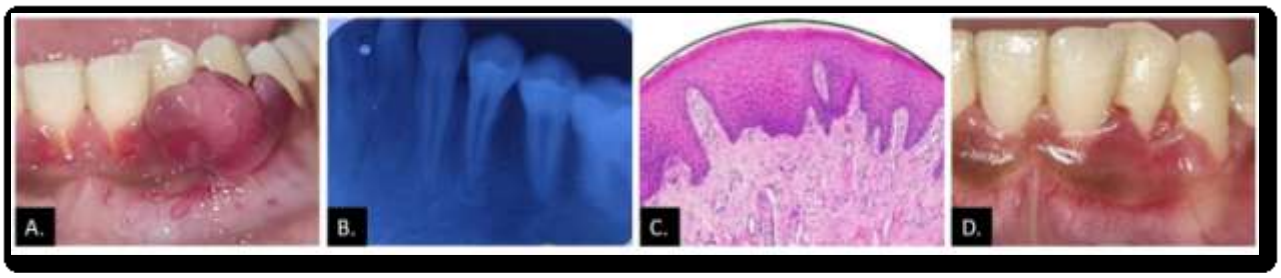

Figure 6 : Case 5A. (A.) Preoperative clinical picture depicting gingival overgrowth w.r.t 32,33 (B.) Radiograph examination, (C.) Histopathological examination, (D.) Follow-up at 4 weeks post excision

Case 5B:
After six-month follow-up, the patient(Case 5B) exhibited a recurrence of the lesion at the previously affected site (teeth 32 and 33). The lesion measured approximately 14 mm × 10 mm, presented as pedunculated, and had a smooth, well-defined margin. To explore the possibility of systemic influences, a comprehensive hormonal profile was evaluated, revealing values within normal physiological limits.

Following Phase I periodontal therapy, a periodontal flap surgery was undertaken to thoroughly debride the underlying tissues. Sutures were removed at the 1-week follow-up visit. The excised lesion was submitted for histopathological analysis, which confirmed the diagnosis of fibroepithelial hyperplasia characterized by a fibrous connective tissue component with granulation tissue rich in plasma cells**.**

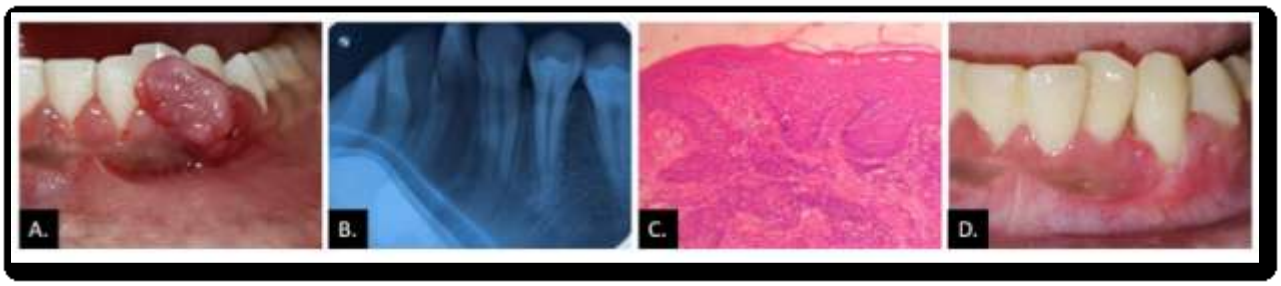

Figure 7 : Case 5B. (A.) preoperative clinical picture depicting gingival overgrowth w.r.t 32,33 (B.) Radiograph examination, (C.) Histopathological examination, (D.) follow-up at 4 weeks post excision

Discussion:-

Reactive lesions of the oral cavity are benign, non-neoplastic tissue overgrowths that occur in response to chronic irritation such as dental plaque, calculus, faulty restorations, and trauma. In this series, confirmed lesions included pyogenic granuloma (PG)**,** and fibrous hyperplasia—alternatively termed irritational fibroma**,** traumatic fibroma**,** fibroepithelial polyp**,** or focal fibrous hyperplasia—as well as squamous epithelial hyperplasia with chronicinflammation**.** They typically present on the gingiva and can resemble true neoplasms clinically, necessitating histopathological confirmation for accurate diagnosis.[5,6]

Pyogenic granuloma (PG)**,** diagnosed in Cases 1, 2, and initially in Case 5, is a commonly encountered vascular lesion arising from an exaggerated localized connective tissue response to minor injury or chronic irritation. It exhibits a predilection for the gingiva and is particularly prevalent among adolescent females, likely due to hormonal influence. Hartzell coined the term in 1904, and it remains a misnomer since PG does not produce pus nor represent true granulomas.[7] Clinically, PG appears as a reddish, hemorrhagic, lobulated mass. Histologically, it comprises granulation tissue with proliferating capillaries and chronic inflammatory infiltrate. PG has an incidence ranging from 14.1% to 26.8% among oral reactive lesions, with a recurrence rate of 15.8%**,** particularly if the irritant

is not removed.[2,6] Vandana Reddy et al. observed PG as the second most common reactive lesion in their 10-year study on North Indian population.[2]

Fibroepithelial polyp -was diagnosed in Cases 3, 5A, and 5B. FEP arises due to chronic mechanical irritation and is the most frequently encountered fibrous lesion of the oral mucosa.[8,9] Clinically, it appears as a firm, sessile or pedunculated nodule with color resembling the adjacent mucosa. According to Paulo et al., FEP accounts for up to 30–40% of reactive lesions.[4] Histologically, the lesion comprises dense collagenous connective tissue with few fibroblasts and an overlying hyperplastic squamous epithelium.[8] The recurrence rate is low (<5%) when the lesion is completely excised along with the elimination of local irritants.[4,8]

Case 4 demonstrated squamous epithelial hyperplasia with chronic inflammation, a less commonly documented diagnosis in literature. This condition represents a reactive epithelial proliferation, typically triggered by chronic mechanical or chemical trauma. Although it is often a secondary histologic finding rather than a distinct entity, studies have reported an incidence of 3–5.6% among gingival lesions submitted for histopathological evaluation.[2,10,11] Clinically, these lesions may appear as thickened, erythematous gingival overgrowths, and histology reveals acanthosis, elongation of rete ridges, and a dense inflammatory infiltrate in the subepithelial stroma. Management includes eliminating irritants and performing conservative surgical excision if necessary. Such lesions may progress into more organized entities like PG or FEP if left untreated.[12]

Case 5 presents a unique example of recurrent reactive gingival lesions in a 13-year-old female patient, highlighting the multifactorial etiology and dynamic histopathological progression observed over nearly two years. Initially diagnosed as a pyogenic granuloma, the lesion recurred twice in the same region (32, 33), with subsequent diagnosis of irritational fibroma and then fibroepithelial hyperplasia with plasma cell-rich granulation tissue. This progression reflects a shift from a highly vascular proliferative response to a more fibrotic and chronically inflamed lesion, suggesting an ongoing low-grade irritative stimulus.

The recurrence may be attributed to incomplete elimination of local etiologic factors, chronic trauma, inadequate surgical clearance, and possibly systemic influences such as hormonal fluctuations during puberty. The presence of plasma cell-rich infiltrate in the final lesion further raises the possibility of an exaggerated immune response or hypersensitivity. Despite surgical interventions, including excisional biopsies and periodontal flap surgery, persistent recurrence emphasizes the need for comprehensive management, including meticulous plaque control, hormonal evaluation, and long-term follow-up to prevent further recurrence.

Reactive gingival lesions like Pyogenic Granuloma, irritational fibroma, and Fibroepithelial polyp are considered non-neoplastic and benign**.** Malignant transformation is exceedingly rare in such lesions. However, lesions with atypical histological features, chronic ulceration, or unresolving growth should raise suspicion. The potential for malignant transformation of such lesions is <1%, and when it occurs, it's often due to misdiagnosis of early squamous cell carcinoma as a reactive lesion.[13]

Across all five cases, toothbrush trauma was a shared etiological factor along with poor oral hygiene, underscoring the importance of properly performed home care practices. Histopathological evaluation remains the gold standard for definitive diagnosis due to overlapping clinical features among reactive lesions. The mainstay of treatment issurgical excision, coupled with the removal of etiological factors. Incomplete excision or failure to address the irritant increases the likelihood of recurrence.[6]

Immunohistochemical analysis using markers such as Ki-67, VEGF, CD31, and CD34 can provide additional insights into the biological behavior of reactive gingival lesions, especially in distinguishing lobular capillary from non-lobular types of pyogenic granuloma and in predicting recurrence risk in ambiguous or recurrent cases.[1] In this context, histopathology remains the gold standard for accurate diagnosis, as clinical differentiation between reactive lesions and true neoplastic growths can be challenging. Pyogenic granulomas may clinically resemble peripheral ossifying fibromas or peripheral giant cell granulomas, while fibrous hyperplasia may be mistaken for benign connective tissue neoplasms. Thus, routine histological examination of all excised gingival lesions is indispensable for establishing an accurate diagnosis.

In pediatric patients, such as the individual presented in Case 5, hormonal fluctuations during adolescence and variable oral hygiene practices contribute to a higher risk of lesion recurrence. These challenges underscore the

importance of behavioral guidance, reinforcement of atraumatic oral hygiene habits, and active parental involvement in long-term preventive strategies. Effective management also hinges on thorough surgical excision, ideally involving curettage down to the periosteum, coupled with the complete elimination of contributing irritants such as plaque, calculus, and mechanical trauma.

Conclusion:-

Reactive lesions of the oral cavity are benign tissue responses to persistent local irritants like trauma or plaque. Despite their alarming clinical appearance, these lesions are non-neoplastic and exhibit characteristic histopathological features. Accurate diagnosis requires a combination of clinical, radiographic, and histological assessment. Surgical excision, along with elimination of the irritant, offers definitive treatment with minimal recurrence. Early recognition and intervention are essential to prevent progression and recurrence of these commonly encountered oral lesions to improve esthetics and functional needs.

Looking ahead, larger cohort studies with extended follow-up durations are warranted to further delineate the recurrence patterns and potential histological evolution of reactive gingival lesions. Future research employing immunohistochemical and molecular profiling may help classify lesion subtypes more accurately and uncover markers predictive of recurrence or progression. Such investigations could ultimately refine therapeutic protocols and improve prognostic accuracy, especially in complex or recurrent presentations.

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