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Beyond the Traumatic Trigger: Unravelling the Spectrum of Oral Lesions Associated With Local Trauma and Irritation

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Abstract

Background: Local mechanical trauma and chronic mucosal irritation are frequent contributors to oral pathology. Repetitive biting, sharp or malpositioned teeth, dental caries, residual roots, tooth mobility, prostheses and parafunctional habits may induce reactive lesions and epithelial changes that clinically mimic neoplasia. However, attributing persistent lesions solely to trauma risks delayed recognition of potentially malignant disease. The present study assessed the clinicopathological spectrum of biopsy-diagnosed oral lesions associated with documented or suspected local traumatic or irritative factors.

Methods: A retrospective review of biopsy records (2021-2025) was conducted at the Department of Oral and Maxillofacial Pathology, Government Dental College and Hospital, Hyderabad. A total of 133 biopsy-diagnosed oral lesions that met the predefined study criteria were included. Patients of all ages and both genders were eligible if a documented or clinically suspected local traumatic, mechanical or chronic irritative factor was identified. Data on demographic characteristics, anatomical site, oral habits, suspected local factors, provisional diagnosis and final histopathological diagnosis were extracted from the biopsy records.

Results: Among the 133 eligible lesions, patient ages ranged from five to 81 years, with a mean age of 38.3 ± 17.1 years. Female cases accounted for 53.4% of the cases. The buccal mucosa was the most frequently affected site (57.9%), followed by the labial mucosa (23.3%) and tongue (17.3%). Dental pathology-related irritation (36.8%) and sharp or malpositioned teeth (32.3%) were the most frequently documented local irritants. The most common histopathological diagnoses were solitary fibroepithelial hyperplasia (19.5%), mucocele (15.0%), fibroma (11.3%) and moderately differentiated squamous cell carcinoma (10.5%). Based on histopathological classification, 66.1% of lesions were benign/reactive, 9.8% were potentially malignant and 24.1% were malignant/neoplastic.

Conclusions: Biopsy-diagnosed oral lesions associated with documented or suspected local trauma or irritation demonstrated a broad clinicopathological spectrum, with benign and reactive lesions predominating. However, potentially malignant lesions and oral squamous cell carcinomas were also identified. Therefore, the presence of a traumatic or irritative factor should not be considered evidence of benignity or assumed to be causal. Persistent, recurrent, indurated, ulcerated or clinically discordant lesions warrant appropriate evaluation and histopathological confirmation.

Categories: Pathology, Oncology, Dentistry
Keywords: chronic irritation, epithelial dysplasia, mechanical trauma, oral mucosa, oral pathology, oral squamous cell carcinoma, reactive lesions

Introduction

The oral mucosa is constantly exposed to mechanical, thermal, chemical and microbial stresses. Repetitive injury caused by biting habits, fractured or malpositioned teeth, caries, residual roots, prostheses and parafunctional activity may produce epithelial hyperplasia, connective-tissue proliferation, ulceration and inflammation. Such traumatic and irritative influences are well recognized in the development of a variety of oral mucosal lesions [1,2]. Reactive lesions of the oral cavity are relatively common and include fibrous hyperplasia, irritational fibroma, pyogenic granuloma, peripheral giant cell granuloma and other reactive proliferations [3]. These lesions generally represent tissue responses to local injury or chronic irritation and may show considerable clinical overlap with other oral pathological conditions [2,3].

Chronic mechanical irritation may arise from dental factors, prosthetic appliances, habitual biting or other repetitive sources of mucosal trauma. A clinicopathological study of chronic mechanical irritation reported that dental factors were among the frequently identified sources, with the buccal mucosa and tongue being commonly affected sites [4]. Although such irritation is frequently associated with reactive lesions, the presence of a local traumatic factor does not necessarily establish the biological nature of the lesion.

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The possible relationship between chronic mechanical trauma and oral cancer has been investigated for several decades. Piemonte et al. (2010) examined the relationship between chronic trauma of the oral mucosa, oral potentially malignant disorders (OPMDs) and oral cancer, suggesting a possible association between chronic trauma and oral mucosal pathology [5]. Subsequently, Singhvi et al. (2017) reviewed the potential role of chronic mucosal trauma in oral carcinogenesis while highlighting the limitations of the available evidence [6]. Similarly, Piemonte et al. (2018) described oral cancer associated with chronic mechanical irritation of the oral mucosa, further drawing attention to the possible relationship between persistent local irritation and oral malignancy [7].

More recently, Gupta et al. (2021) conducted a systematic review and meta-analysis that suggested a possible association between chronic mechanical irritation and oral squamous cell carcinoma (OSCC), while emphasizing the need for caution in interpreting this association as evidence of an independent carcinogenic effect [8]. Similarly, Pentenero et al. (2022), in a systematic review, concluded that the available evidence was insufficient to establish chronic mechanical trauma as an independent risk factor for OSCC, owing to the limited number and methodological quality of eligible studies [9]. Taken together, these findings indicate that a definitive causal relationship between chronic mechanical irritation and oral carcinogenesis remains unestablished.

Oral potentially malignant disorders comprise a heterogeneous group of mucosal conditions associated with an increased risk of oral cancer and may demonstrate variable clinical appearances [10]. Their clinical presentation may overlap with benign or reactive mucosal changes, making appropriate clinical assessment and histopathological evaluation important in selected cases [11]. Reactive white lesions, including frictional and contact keratoses, may also arise in response to local irritation and may enter the differential diagnosis of clinically suspicious white lesions [12].

Most previous studies have focused on individual reactive lesions, specific forms of mechanical irritation or the possible relationship between chronic trauma and oral cancer [1,4-9]. Limited data are available regarding the broader clinicopathological spectrum of biopsy-diagnosed oral lesions associated with documented or suspected local traumatic or irritative factors.

The present study therefore undertook a five-year retrospective evaluation of oral biopsy records associated with documented or suspected traumatic, mechanical or chronic irritative factors. The study aimed to characterize the clinicopathological spectrum of these lesions and to determine whether potentially malignant and malignant lesions were also represented within this clinically trauma-associated group.

Materials And Methods

Study design and setting

The present five-year retrospective clinicopathological study was conducted in the Department of Oral and Maxillofacial Pathology at Government Dental College & Hospital, Hyderabad, Telangana, India. Existing biopsy records from January 2021 to December 2025 were reviewed, with no direct patient contact or intervention. Patient-identifying information was excluded from the study dataset and manuscript, and the findings were reported in an anonymized and aggregated format.

Biopsy records from January 2021 to December 2025 were systematically reviewed to identify oral lesions associated with documented or suspected local traumatic, mechanical or chronic irritative factors. The study was designed as a record-based analysis of biopsy-diagnosed lesions encountered in routine tertiary dental practice.

The study period included the later phase of the COVID-19 pandemic and the subsequent recovery period. Changes in healthcare access, patient attendance, referral patterns and biopsy practices during this period were considered potential factors influencing case ascertainment.

Case selection

Cases were identified from the institutional biopsy database and included when the clinical record documented or clinically suspected a local traumatic, mechanical or chronic irritative factor at or near the site of the biopsy-diagnosed lesion. Importantly, the study did not assume that trauma was the direct cause of the lesion; therefore, the term “associated with documented or suspected local traumatic/irritative factors” was used throughout the study to distinguish clinical association from proven causation.

Inclusion criteria

Cases were included in the study based on the availability of a biopsy specimen with a definitive histopathological diagnosis and the presence of a lesion involving the oral mucosa or oral soft tissues. In addition, the lesion was required to have a documented or clinically suspected association with a local traumatic, mechanical or chronic irritative factor. Only cases with sufficient demographic and clinicopathological information to allow appropriate evaluation and analysis were included. Patients of both

genders were eligible for inclusion, with no restriction based on gender. Cases from all age groups were considered eligible, provided they fulfilled the specified clinical, histopathological and clinicopathological inclusion criteria.

Exclusion criteria

Cases were excluded from the study where a definitive histopathological diagnosis was not available or when the clinical records did not provide sufficient information regarding the suspected local traumatic or irritative factor. Lesions that were determined to be unrelated to a local traumatic, mechanical or chronic irritative mechanism were also excluded. In addition, cases lacking essential demographic or lesion-site information required for adequate clinicopathological assessment were not included in the study.

Informed consent

Because this was a retrospective, record-based study involving existing biopsy records, with no direct patient intervention or contact, individual informed consent was not obtained. The analysis was limited to information available in the institutional records.

Data collection

Data on patient age, gender, anatomical site, documented oral habits, suspected local traumatic or irritative factors, provisional clinical diagnosis and final histopathological diagnosis were extracted from the biopsy records.

Where multiple local factors were documented, the factor considered most directly related to the lesion was recorded for primary categorization.

The retrospective nature of the study limited the assessment to information documented in the available records. Therefore, detailed evaluation of the frequency, duration, intensity and timing of individual traumatic or irritative exposures was not possible.

Statistical analysis

Data were entered into a spreadsheet and analyzed using IBM SPSS Statistics version 26.0 (IBM Corp., Armonk, NY, USA). Continuous variables were summarized using mean, standard deviation, median and range, while categorical variables were summarized using frequencies and percentages. Associations between selected categorical variables (gender, age group, anatomical site, documented oral habit and biological behaviour) were assessed using Pearson's chi-square test when expected cell counts were adequate and the Fisher-Freeman-Halton exact test when expected counts were small. A two-sided P-value <0.05 was considered statistically significant.

The analysis was intended primarily to characterize the distribution and clinicopathological spectrum of the lesions. Inferential analyses were exploratory and described associations within the cohort; they were not intended to estimate a causal effect of trauma or irritation.

Results

Demographic characteristics

A total of 133 biopsy-diagnosed oral lesions met the study inclusion criteria. Patient age ranged from five to 81 years, with a mean age of 38.3 ± 17.1 years and a median age of 40 years. Among the 133 cases, 71 (53.4%) occurred in female cases and 62 (46.6%) in male cases, giving a female-to-male ratio of approximately 1.15:1. Most cases occurred among patients in the 20-59-year age range.

For inferential analysis, cases were grouped by age as ⩽19 years (17 cases, 12.8%), 20-39 years (48 cases, 36.1%), 40-59 years (52 cases, 39.1%) and ⩾60 years (16 cases, 12.0%).

Anatomical distribution

The buccal mucosa was the predominant anatomical site, accounting for 77 cases (57.9%). The labial mucosa/lip accounted for 31 cases (23.3%), followed by the tongue in 23 cases (17.3%). Two cases (1.5%) involved other oral sites, namely the retromolar region and pterygomandibular raphe.

The predominance of the buccal mucosa is consistent with its exposure to occlusal contact, cheek biting, sharp cusps, residual roots and other local mechanical factors.

Documented or suspected traumatic/irritative factors

The most frequently identified category was dental pathology-related irritation, comprising 49 cases (36.8%). The second most common category was sharp or malpositioned teeth, identified in 43 cases

(32.3%), followed by biting-related trauma in 32 cases (24.1%). Prosthetic irritation was documented in five cases (3.8%), other identifiable physical trauma in two cases (1.5%) and other/unspecified factors in two cases (1.5%).

Oral habits

A documented oral habit was identified in 41 cases (30.8%), whereas no oral habit was documented in 92 cases (69.2%). Because the study was retrospective, absence of documentation was not interpreted as definite absence of an oral habit.

Histopathological spectrum

The final histopathological diagnoses demonstrated a broad spectrum of lesions. Solitary fibroepithelial hyperplasia was the most frequently recorded diagnosis, accounting for 26 cases (19.5%), followed by mucocele in 20 cases (15.0%), fibroma in 15 cases (11.3%) and moderately differentiated squamous cell carcinoma in 14 cases (10.5%). OSCC accounted for 10 cases (7.5%), while pyogenic granuloma and fibroepithelial hyperplasia each accounted for eight cases (6.0%). Other diagnoses included epithelial dysplasia, carcinoma in situ, squamous cell carcinomas of varying degrees of differentiation, and other less frequently encountered pathological entities.

Microscopic examination revealed characteristic features that helped distinguish reactive lesions from epithelial dysplasia and malignancy. Fibroepithelial hyperplasia showed collagenous connective tissue with epithelial hyperplasia, elongated rete ridges and variable inflammatory cell infiltration. Mucoceles demonstrated extravasated mucin surrounded by granulation tissue containing foamy macrophages and inflammatory cells. Fibroma typically exhibited dense collagenous connective tissue covered by thin, flattened epithelium, with absent or inconspicuous rete ridges and minimal inflammation, whereas pyogenic granuloma showed vascular granulation tissue with a prominent inflammatory cell infiltrate. Epithelial dysplasia was characterized by abnormal epithelial maturation and cytological atypia, while carcinoma in situ demonstrated full-thickness epithelial involvement without invasion into the underlying connective tissue. In contrast, OSCC exhibited invasive nests, cords, or islands of malignant squamous epithelial cells within the connective tissue, accompanied by cytological atypia, nuclear hyperchromatism and variable keratinization depending on the degree of differentiation. The distribution of the major histopathological diagnoses is presented in Table *1*, and representative photomicrographs illustrating the characteristic microscopic features are presented in Figure *1*.

Final histopathological diagnosis	n (%)
Solitary fibroepithelial hyperplasia	26 (19.5)
Mucocele	20 (15.0)
Fibroma	15 (11.3)
Moderately differentiated squamous cell carcinoma	14 (10.5)
Oral squamous cell carcinoma	10 (7.5)
Pyogenic granuloma	8 (6.0)
Fibroepithelial hyperplasia	8 (6.0)
Moderate epithelial dysplasia	4 (3.0)
Moderately to poorly differentiated squamous cell carcinoma	3 (2.3)
Carcinoma in situ	2 (1.5)
Severe epithelial dysplasia	2 (1.5)
Mild epithelial dysplasia	2 (1.5)
Ancillary pathological entities	19 (14.3)
Total	133 (100)

TABLE 1: Distribution of major histopathological diagnoses among the study cases, expressed as frequency and percentage (n (%)).

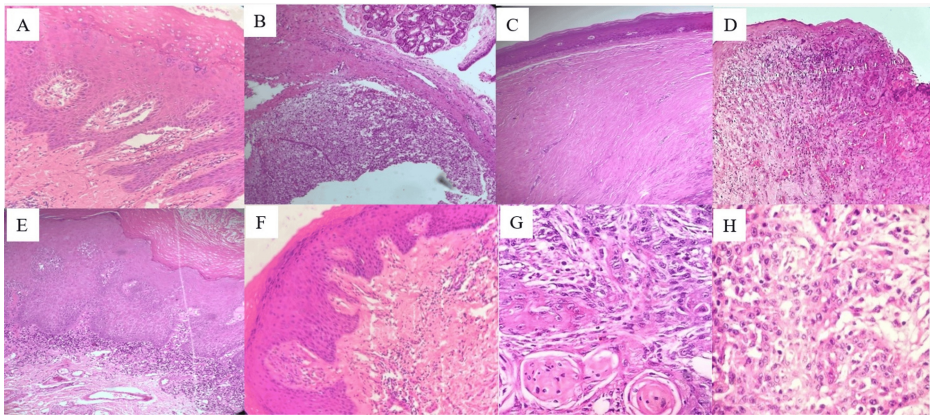


FIGURE 1: Representative histopathological features of oral lesions associated with local trauma and irritation (H&E staining).

(A) Solitary fibroepithelial hyperplasia with hyperplastic epithelium and fibrous connective tissue. (B) Mucocele with extravasated mucin and mucin-laden macrophages. (C) Fibroma with dense collagenous tissue and spindle-shaped fibroblasts. (D) Pyogenic granuloma with vascular granulation tissue and inflammation. (E) Epithelial dysplasia with architectural disorganization and cytological atypia. (F) Carcinoma in situ with full-thickness epithelial dysplasia without invasion. (G) Moderately differentiated squamous cell carcinoma with invasive nests and keratin pearls. (H) Poorly differentiated squamous cell carcinoma with marked pleomorphism and minimal keratinization.

Overall, the histopathological spectrum extended beyond conventional reactive lesions to include epithelial dysplasia, carcinoma in situ and invasive carcinoma, highlighting the importance of histopathological examination in distinguishing reactive lesions from potentially malignant and malignant epithelial lesions.

Broad biological classification

When the final diagnoses were grouped according to biological behaviour, benign/reactive lesions constituted 88 of 133 cases (66.2%). Potentially malignant lesions accounted for 13 cases (9.8%), while 32 cases (24.1%) were classified as malignant/neoplastic lesions. Overall, 45 cases (33.8%) demonstrated potentially malignant or malignant histopathological features.

Biological behaviour was significantly associated with gender, documented oral habit, anatomical site and age group. For gender, the association was significant on Pearson's chi-square test ($\chi^2 = 15.22$, $P < 0.001$). Significant associations were also observed for documented oral habit (Fisher-Freeman-Halton exact test, $P < 0.001$), anatomical site (Fisher-Freeman-Halton exact test, $P = 0.001$) and age group (Fisher-Freeman-Halton exact test, $P < 0.001$). The distribution of benign/reactive, potentially malignant and malignant/neoplastic lesions across these variables is presented in Table *2*.

Variable	Category	Benign/reactive (n=88)	Potentially malignant (n=13)	Malignant/neoplastic (n=32)	P-value	Test statistic	Test
Gender	Female	57	6	8	<0.001	$\chi^2 = 15.22$	Pearson χ^2
	Male	31	7	24			
Documented oral habit	Absent	71	7	14	<0.001	--	Fisher-Freeman-Halton exact
	Present	17	6	18			
Anatomical site	Buccal mucosa	52	7	18	0.001	--	Fisher-Freeman-Halton exact
	Labial mucosa/lip	26	4	1			
	Other oral sites	1	0	1			
	Tongue	9	2	12			
Age group	≤19 years	16	1	0	<0.001	--	Fisher-Freeman-Halton exact
	20-39 years	41	6	1			
	40-59 years	24	3	25			
	≥60 years	7	3	6			

TABLE 2: Associations between selected categorical variables and biological behaviour of 133 lesions.

These associations describe the distribution of biological behaviour within the study cohort and should not be interpreted as evidence of a causal relationship between the recorded traumatic or irritative factors and the pathological outcomes. The presence of an apparent local traumatic or irritative factor did not, by itself, distinguish benign/reactive lesions from potentially malignant or malignant pathology.

Discussion

Local trauma and chronic irritation are common and clinically relevant features encountered during the evaluation of oral mucosal lesions. Repeated mechanical stimulation from biting, sharp or malpositioned teeth, carious or fractured teeth, residual roots, prostheses and parafunctional activity may produce a range of tissue responses, including epithelial alterations, inflammation, ulceration and reactive connective-tissue proliferation. Many of these lesions are benign and reactive in nature and may present with clinical features that overlap with other oral mucosal disorders [1,2,4]. Consequently, the identification of a plausible local traumatic or irritative factor is an important component of clinical assessment, but it does not necessarily explain the biological nature of the lesion.

The diagnostic challenge becomes particularly important when a persistent or clinically suspicious lesion occurs at a site exposed to chronic mechanical irritation. Although local trauma may contribute to the development or persistence of reactive lesions, the presence of an identifiable irritant does not exclude an underlying potentially malignant or malignant process. Previous literature has suggested a possible relationship between chronic mechanical irritation and OPMDs or OSCC, although the available evidence remains inconsistent and does not establish a definitive causal relationship [5-9]. A lesion may therefore coexist with a local traumatic factor without the factor being responsible for its development. Conversely, an already existing pathological lesion may undergo repeated trauma because of its location, surface characteristics, ulceration or altered tissue architecture.

This distinction is clinically important because attributing a persistent lesion solely to an apparent traumatic source may result in premature diagnostic closure and delayed definitive diagnosis. Reports of OSCC initially interpreted as a response to chronic mechanical trauma further illustrate this diagnostic difficulty. Histopathological examination therefore remains essential when the clinical behaviour or appearance of a lesion is inconsistent with a simple reactive process.

Against this background, the present five-year retrospective study demonstrated that biopsy-diagnosed oral lesions associated with documented or suspected local traumatic or irritative factors constitute a

heterogeneous clinicopathological spectrum. Although benign and reactive lesions represented the majority of cases, potentially malignant epithelial lesions and malignant lesions were also identified. These findings emphasize that the identification of a local traumatic or irritative factor should be considered part of the clinical history rather than a definitive explanation for the biological nature of an oral lesion.

The predominance of benign/reactive lesions in the present study is consistent with the established spectrum of oral reactive proliferations. Such lesions may develop in response to persistent local irritation and may demonstrate overlapping clinical features, making histopathological examination important for definitive classification [3]. Standard oral pathology references similarly describe fibrous hyperplasia, irritation fibroma, mucoceles, pyogenic granuloma and related entities within the broad spectrum of benign and reactive oral mucosal pathology [2].

The distribution observed in the present study is also comparable with findings from retrospective studies of reactive oral lesions. A 10-year observational study demonstrated that reactive hyperplastic lesions constitute a substantial proportion of oral biopsy diagnoses, with focal fibrous hyperplasia among the commonly encountered entities [13]. Similarly, another retrospective investigation documented a broad spectrum of reactive lesions, including pyogenic granuloma and irritation fibroma, emphasizing their frequency in routine oral pathology practice [14].

The buccal mucosa was the most frequently affected anatomical site in the present study. This finding is clinically plausible because the buccal mucosa is exposed to repetitive occlusal contact, cheek biting and other forms of mechanical irritation. Previous literature describing chronic mechanical irritation has also identified the buccal mucosa and tongue among sites exposed to repeated local trauma [4]. These observations provide clinical context for the predominance of buccal lesions in the present cohort.

Dental pathology-related irritation and sharp or malpositioned teeth were the most frequently documented or suspected local factors in the present study. These findings emphasize the importance of careful intraoral examination when evaluating persistent mucosal lesions. Sharp cusps, fractured or carious teeth, residual roots, prosthetic appliances and other local abnormalities may provide repeated sources of mechanical stimulation [1,2,4].

Biting-related trauma was also a substantial finding, accounting for 22.6% of cases. Cheek and lip biting may occur consciously or unconsciously and may be associated with dental abnormalities or parafunctional activity. Importantly, the absence of a documented oral habit in a retrospective record should not be interpreted as definite evidence that such a habit was absent. Because the present study relied on information available in biopsy records, underdocumentation of habits or intermittent traumatic exposures cannot be excluded.

Trauma does not equal benignity

One of the clinically relevant findings of the present study was the identification of potentially malignant and malignant lesions among biopsy-diagnosed lesions associated with documented or suspected local trauma or irritation. Potentially malignant epithelial lesions were identified in 13 cases (9.8%), while malignant lesions were identified in 32 cases (24.1%). These findings should not be interpreted as evidence that local trauma or irritation caused these lesions. Rather, they demonstrate that an apparent traumatic or irritative factor may coexist with clinically significant epithelial pathology.

A lesion may occur adjacent to a sharp tooth, fractured restoration, denture edge or habitual biting site while representing an independent pathological process. Conversely, a pre-existing pathological lesion may itself become repeatedly traumatized because of its size, anatomical location, ulceration, surface characteristics or altered tissue architecture. Therefore, the presence of trauma at the site of a lesion does not establish a temporal or causal relationship between the exposure and the lesion.

Recent reports have highlighted the diagnostic difficulty that may occur when OSCC is initially interpreted as a reaction to chronic mechanical trauma. Ashrafi et al. described two cases in which OSCC was misinterpreted as a reaction to chronic mechanical trauma, emphasizing the potential diagnostic difficulty associated with attributing a suspicious lesion to an identified local irritant [15]. Thus, recognition of a traumatic source should not replace appropriate clinical assessment and histopathological evaluation.

The relationship between chronic mechanical irritation and OSCC remains uncertain. Earlier observational studies and reviews have suggested a possible association between chronic mucosal trauma, potentially malignant disorders and oral cancer [5-7]. However, systematic reviews have reached differing conclusions regarding the strength and interpretation of the available evidence. A systematic review and meta-analysis reported an association between chronic mechanical irritation and OSCC [8], whereas another systematic review concluded that the available evidence was insufficient to establish a strong association [9]. Consequently, carcinoma occurring at a site exposed to chronic irritation should be regarded as a coexistence or clinical association rather than proof of causation.

The present study was not designed to determine whether the recorded traumatic or irritative factors contributed to lesion development or malignant transformation. The retrospective design, absence of a non-trauma comparison group, reliance on information documented in biopsy records and inability to establish the temporal relationship between the suspected irritant and lesion development prevent causal inference. In addition, the study did not assess the intensity, frequency or duration of individual traumatic exposures. These limitations are important when interpreting the coexistence of local trauma with potentially malignant or malignant pathology.

Clinical significance of potentially malignant and malignant lesions

The identification of potentially malignant and malignant lesions within this cohort has important implications for oral healthcare professionals. Suspicious oral mucosal lesions require appropriate clinical assessment and the American Dental Association evidence-based guideline emphasizes biopsy or appropriate specialist referral for definitive evaluation of potentially malignant oral lesions [16].

Recent living evidence-informed guidance continues to support biopsy as the definitive diagnostic approach for OPMDs and OSCC [17]. Additional guidance evaluating vital staining and light-based adjuncts similarly places tissue biopsy at the center of definitive diagnostic evaluation [18,19]. These recommendations are particularly relevant to the present study because a local traumatic factor may provide an apparently satisfactory clinical explanation for a lesion. However, the coexistence of a plausible local irritant does not exclude an OPMD or malignancy.

Oral potentially malignant disorders encompass a heterogeneous group of conditions with differing risks of malignant transformation. The risk of progression varies according to the specific disorder and associated clinical and histopathological characteristics [20]. Systematic evidence has further demonstrated that clinical and pathological characteristics may influence the risk of malignant transformation and recurrence [21]. Therefore, a persistent or clinically suspicious lesion should not be considered benign solely because a possible source of mechanical irritation has been identified.

The clinical appearance of an oral lesion alone may also be insufficient to determine its biological behaviour. Consensus recommendations have emphasized standardized nomenclature and classification of potentially malignant disorders, while clinical reviews have highlighted their variable clinical presentation [10,11]. Earlier work on the terminology and classification of potentially malignant disorders similarly emphasized the importance of appropriate nomenclature and recognition of lesions associated with increased cancer risk [22].

Clinical implications

The findings of the present study have several implications for oral healthcare professionals.

First, local traumatic and irritative factors should be actively sought during the examination of persistent oral lesions. Clinical assessment should include evaluation for sharp cusps, fractured or carious teeth, residual roots, malpositioned teeth, occlusal trauma, dentures, prosthetic restorations and biting habits [1,2,4].

Second, correction of an obvious local irritant may be appropriate when a reactive lesion is clinically suspected. However, clinical resolution should be documented rather than assumed. The identification of a local factor should therefore prompt appropriate management and follow-up rather than immediate diagnostic closure.

Third, lesions that persist despite elimination of the suspected irritant should undergo further evaluation, including biopsy or referral to an appropriate specialist [16-19]. This approach is particularly important when the clinical behaviour of the lesion is inconsistent with a simple traumatic lesion.

Fourth, persistent ulceration, induration, progressive enlargement, unexplained bleeding, fixation, significant surface alteration or suspicious red or white mucosal changes should prompt appropriate diagnostic assessment rather than attribution to trauma alone [10,11,16-19].

Finally, the coexistence of traumatic or irritative factors with potentially malignant and malignant lesions in the present dataset emphasizes the importance of avoiding premature diagnostic closure. The presence of an apparent local irritant should not substitute for appropriate clinical assessment, follow-up or histopathological examination when indicated.

The central clinical implication of the present study is therefore that a plausible traumatic factor may explain the clinical setting, but it does not, by itself, establish the diagnosis or biological nature of the lesion.

Strengths of the study

The principal strengths of the present study include the relatively large biopsy-based series of 133 cases, the five-year study period and inclusion of a broad range of local traumatic and irritative factors.

Unlike studies restricted to individual reactive lesions or specific forms of trauma, the present analysis captures a wider diagnostic spectrum encountered in routine tertiary oral pathology practice.

Another strength is the inclusion of both benign/reactive and neoplastic outcomes. This allows the study to highlight an important clinical issue: the apparent presence of local trauma does not reliably predict the biological behaviour of an oral lesion.

The study also deliberately distinguishes clinical association from causation, thereby avoiding the assumption that chronic trauma is responsible for malignant transformation.

Limitations

The retrospective design limited documentation of traumatic or irritative exposures, medical history and smoking status, restricting the assessment of potential confounders. The absence of a non-trauma comparison group also precluded establishing causal relationships between local trauma or irritation and oral lesions.

Conclusions

Oral lesions associated with documented or suspected local trauma and irritation exhibited a broad clinicopathological spectrum, with benign and reactive lesions constituting the majority. The buccal mucosa was the most frequently affected site, and dental pathology-related irritation and sharp or malpositioned teeth were the predominant local factors identified. Importantly, potentially malignant epithelial lesions and carcinomas were also observed, indicating that the presence of a suspected traumatic or irritative factor does not necessarily predict benign pathology or establish a causal relationship with malignant transformation. Therefore, persistent, recurrent or clinically suspicious oral lesions warrant appropriate diagnostic evaluation and histopathological confirmation.

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

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Disclosures

Human subjects: Informed consent for treatment and open access publication was obtained or waived by all participants in this study. **Animal subjects:** All authors have confirmed that this study did not involve animal subjects or tissue. **Conflicts of interest:** In compliance with the ICMJE uniform disclosure form, all authors declare the following: **Payment/services info:** All authors have declared that no financial support was received from any organization for the submitted work. **Financial relationships:** All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. **Other relationships:** All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

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