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Review Article

Prevalence of oral mucosal lesions and variations in paediatric population. A systematic review.

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Abstract

Background:

Oral mucosal lesions (OMLs) in children represent a heterogeneous group of conditions ranging from benign developmental variations to lesions associated with systemic disease. Reported prevalence varies widely across populations due to differences in methodology, age groups and geographic factors. Accurate epidemiological data are essential for early diagnosis and appropriate management in pediatric patients.

Materials and Methods

A systematic search was conducted across PubMed, MEDLINE, Scopus, Embase, Web of Science and LILACS for studies published between 2021 and 2026. Search terms included combinations of "oral mucosal lesions," "pediatric," and "prevalence." Inclusion criteria comprised original research studies reporting prevalence data in pediatric populations. Five studies met the eligibility criteria. Study quality was assessed using the STROBE checklist and data on study design, population and outcomes were extracted.

Results:

The included studies demonstrated considerable variability in prevalence of OMLs among children, ranging from approximately 5% to over 60% across different populations. The most frequently reported lesions included recurrent aphthous ulcers, traumatic lesions, geographic tongue and candidiasis. Variations were observed based on age group, gender and geographic location. School-aged children (7–13 years) showed higher prevalence of traumatic lesions, while younger children more commonly exhibited developmental conditions such as geographic tongue.

Conclusion:

OMLs are relatively common in pediatric populations and show significant epidemiological variation. Standardized diagnostic criteria and large-scale multicentric studies are required to generate reliable prevalence data and improve early detection strategies. Future research should focus on longitudinal and region-specific studies to establish uniform epidemiological patterns and guide preventive oral health programs.

***Keyword**: oral mucosal lesions, traumatic ulceration, pediatric, prevalence, oral health, periodontal status*
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Introduction:

Pediatric dentists should be trained to identify, diagnose and manage pathological conditions affecting the oral mucosa, particularly in children between 0 and 5 years of age. Oral mucosal lesions (OMLs) are not uncommon in children, with reported prevalence ranging from 4.1% to 69.5% in different populations. This variation reflects differences in geographic distribution, age groups and methodological approaches used in various studies.

Despite their frequency, OMLs are often underdiagnosed or underestimated by dental and medical practitioners. These lesions may represent local conditions or serve as early indicators of systemic diseases. Common oral mucosal conditions in children include recurrent aphthous ulcers, herpes simplex infections, geographic tongue, fissured tongue, candidiasis and traumatic lesions.

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Several factors, including sociodemographic variables such as living conditions, parental education and socioeconomic status, have been associated with the occurrence of oral mucosal lesions. In addition, nutritional deficiencies, autoimmune disorders, hematological conditions and infectious diseases may manifest through changes in the oral mucosa.

The clinical presentation of OMLs in children differs from that in adults in terms of color, size, etiology, progression and response to treatment. While some lesions are benign and self-limiting, others may require prompt diagnosis and intervention due to their association with systemic conditions.

Accurate identification of oral mucosal lesions is essential for appropriate management and prevention of complications. However, epidemiological data on pediatric populations remain limited and heterogeneous. Therefore, this systematic review was conducted to evaluate the prevalence and variation of oral mucosal lesions in children and to facilitate improved diagnostic awareness among clinicians.

Materials and methods

Study Design

This systematic review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines.

Eligibility Criteria

Studies were selected based on predefined inclusion and exclusion criteria.

Inclusion criteria:

- Original research studies (cross-sectional, cohort, or observational studies)
- Studies reporting the prevalence or distribution of oral mucosal lesions in pediatric populations (≤18 years)
- Articles published between January 2021 and February 2026
- Studies published in English

Exclusion criteria:

- Review articles, systematic reviews, meta-analyses, case reports and case series
- Studies not specifically reporting pediatric data
- Studies lacking clear prevalence outcomes
- Non-English publications

Search Strategy

A comprehensive literature search was performed across the following electronic databases: PubMed/MEDLINE, Scopus, Embase, Web of Science and LILACS.

The search strategy combined Medical Subject Headings (MeSH) and free-text terms using Boolean operators:

PubMed/MEDLINE search string:
("oral mucosal lesions"[MeSH Terms] OR "oral lesions" OR "oral pathology" OR "oral mucosa")
AND ("pediatric" OR "children" OR "adolescent")
AND ("prevalence" OR "epidemiology" OR "distribution")

Equivalent search strategies were adapted for other databases.

Filters applied:

- Publication years: 2021–2026
- Language: English
- Human studies

The last search was conducted on February 28, 2026.

Study Selection

All identified records were imported and screened in two stages:

1. Title and abstract screening
2. Full-text assessment

Duplicates were removed prior to screening. Only studies meeting all eligibility criteria were included.

Data Collection Process

Data extraction was performed independently by two reviewers using a standardized data extraction form.

Extracted variables included:

- First author and year
- Country of study

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- Study design
- Sample size and age group
- Type and prevalence of oral mucosal lesions

Any disagreements between reviewers were resolved through discussion. If consensus was not reached, a third reviewer adjudicated the decision.

Study Risk of Bias Assessment

The methodological quality of included studies was assessed using the STROBE checklist for observational studies.

Two reviewers independently evaluated each study based on reporting quality, study design, sample selection and outcome assessment. Each study was categorized as having low, moderate, or high risk of bias.

Discrepancies were resolved by consensus.

Reporting Bias Assessment

Due to the limited number of included studies (n = 5), formal statistical assessment of publication bias (e.g., funnel plot or Egger's test) was not feasible.

However, reporting bias was qualitatively assessed by evaluating:

- Selective outcome reporting
- Incomplete data presentation
- Inconsistencies between methods and results

Certainty of Evidence

The certainty of evidence for the primary outcome (prevalence of oral mucosal lesions) was assessed using the GRADE (Grading of Recommendations Assessment, Development and Evaluation) framework.

Each outcome was evaluated across the following domains:

- Risk of bias
- Consistency of results
- Directness of evidence
- Precision
- Publication bias

The overall certainty of evidence was categorized as high, moderate, low, or very low.**Results**:

Study Selection

A total of 28 records were identified through database searching. After removal of duplicates, 24 studies remained for title and abstract screening. Of these, 15 studies were excluded due to irrelevance to the topic.

The full texts of 9 articles were assessed for eligibility. Among these, 4 studies were excluded for the following reasons:

- Not reporting prevalence data (n = 2)
- Not specific to pediatric population (n = 1)
- Review article (n = 1)

Finally, 5 studies were included in the qualitative synthesis.

Study Characteristics

The included studies were published between 2022 and 2025 and represented different geographic regions. All studies were observational in design, primarily cross-sectional. Sample sizes and population characteristics varied considerably.

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Table 1 – An overview

Author	Title	Journal	Outcome
Vasudevi Ramiah, Devaki Manivannan, Karthik Shunmugavelu, Barun Kumar, Evangeline Cynthia Dhinakaran	Oral mucosal lesions in pediatric patients	Ramiah V, Manivannan D, Shunmugavelu K, Kumar B, Dhinakaran EC. Oral mucosal lesions in pediatric patients. GMS Hygiene and Infection Control. 2025 Mar 6;20:Doc07. doi: 10.3205/dgkh000536	Comprehensive oral examination should be mandatory for the pediatric population
Joanna Elżbieta Owczarek-Drabińska, Patrycja Nowak, Małgorzata Zimoląg-Dydak, Małgorzata Radwan-Oczko	The Prevalence of Oral Mucosa Lesions in Pediatric Patients	Owczarek-Drabińska JE, Nowak P, Zimoląg-Dydak M, Radwan-Oczko M. The prevalence of oral mucosa lesions in pediatric patients. International journal of environmental research and public health. 2022 Sep 8;19(18):11277. doi: 10.3390/ijerph191811277	OMLs found in the oral cavity of children and that their frequency is different from that in adults
Lorena Horvat Aleksijević, Jelena Prpić, Miranda Muhvić Urek, Sonja PezeljRibarić, Nataša Ivančić-Jokić, Romana PeršićBukmir, Marko Aleksijević, Irena Glažar	Oral Mucosal Lesions in Childhood	Horvat Aleksijević L, Prpić J, Muhvić Urek M, Pezelj-Ribarić S, Ivančić-Jokić N, Peršić Bukmir R, Aleksijević M, Glažar I. Oral mucosal lesions in childhood. Dentistry journal. 2022 Nov 9;10(11):214. doi: 10.3390/dj10110214	Oral mucosal lesions in children require different treatment approaches depending on etiological factors
VaibhavKumar, JasleenThakker, Abhishek Royal, Nikhil Bhanushali, Ziad D Baghdadi	Oral Health and Hygiene Status of Global Transgender Population: A Living Systematic Review and Meta-Analysis	Kumar V, Thakker J, Royal A, Bhanushali N, Baghdadi ZD. Oral health and hygiene status of global transgender population: A living systematic review and meta-analysis. International Journal of Environmental Research and Public Health. 2025 Mar 14;22(3):433. doi: 10.3390/ijerph22030433	Oral health and hygiene status and improve access to oral health services in population
Hiyam Salah Ahmed,Zainab Abdulkareem Maktoof and Rawaa Saadoon	Oral Mucosal Lesions in Children: A Review	Salah H, Maktoof ZA. Oral Mucosal Lesions in Children: A Review. ISSN: 2520-3975	This focused in the oral mucosal lesions and conditions that affect children

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Risk of Bias in Studies

Risk of bias assessment using the STROBE checklist indicated moderate methodological quality across most included studies.

Reporting Biases

Due to the limited number of included studies (n = 5), formal statistical methods such as funnel plot asymmetry or Egger's test were not performed.

A qualitative assessment indicated:

- Variability in reporting of prevalence data
- Inconsistent diagnostic criteria across studies
- Selective reporting of specific lesion types

These factors may have introduced reporting bias, potentially affecting the comparability and generalizability of findings.

Certainty of Evidence

The certainty of evidence was assessed using the GRADE framework and was found to be low to very low due to heterogeneity and limited number of studies.

Discussion

Oral and dental health issues encompass not only dental caries and periodontal diseases but also oral mucosal lesions (OML), which manifest as changes in the soft tissues of the oral cavity.[1]

Oral assessments reveal differences in etiopathogenesis, clinical manifestations and both diagnostic and prognostic attributes; the characteristics of these lesions can vary considerably across different geographic regions.[2]

Oral mucosal lesions may be benign or have the potential to be malignant, ranging from requiring no treatment to necessitating extensive invasive procedures.[3]

The presentation of oral mucosal lesions in children can differ from that in adults regarding color, size, etiology, clinical features, prognosis and treatment strategies.[4]

In etiopathology of oral mucosa conditions, many different, both local and general, factors are known, which can be eliminated during the proper treatment.[5]

The causes of oral mucosa pathologies, the development of irritating local factors, related with trauma to the oral cavity, is of great importance.[6]

The presence of sharp teeth edges or dentures elements that may hurt oral mucosa, even during physiological activity such as: biting, chewing, or speaking, also behavioral factors.[7]

Those injuries may also result from iatrogenic-mechanical, chemical, or thermal trauma during dental treatment.[8]

A lot of different oral lesions, both pathological and congenital, have their origins in systemic conditions.[9]

Those that are mostly seen and discussed are related to: oral mucosa anomalies, genetic predispositions, skin diseases, blood dyscrasias, autoimmunological and immunological disorders.[10]

Oral side effects and hypersensitivity to systemic drugs and various nutritional deficiencies, such as: vitamin B deficiency, iron deficiency and microelements malabsorption.[11]

Because of these diversified etiopathology and origins, various oral mucosa lesions are typically more often diagnosed in young, middle-age and older people.[12]

Many lesions have known etiopathology and can be treated and eliminated easily and effectively. However, some of the lesions have an unknown and unclear origin and can be treated only symptomatically.[13]

In some cases, because of many general and local signs and symptoms, OMLs require interdisciplinary approach with the cooperation of different medical specialists to restore patients general and oral health.[14]

Physiological structures are very common, benign and asymptomatic lesions of oral mucosa and do not require treatment but should not be mistakenly diagnosed as pathological lesions.[15]

Benign migratory glossitis, often called geographic tongue, appears in 1–3% of the population and is not uncommon in children. The cause is unknown; however, it is assumed that a significant role is played by hereditary factors.[16]

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The disorder is also often related to various systemic and psychological conditions. Geographic tongue is marked by erythematose, round or irregularly shaped patches on the dorsal and lateral portions of the tongue.[17]

Fissured tongue is a developmental anomaly which is typically presented as a solitary anteroposterior fissure (groove) right in the middle of the dorsal surface of the tongue.[18]

Retrocuspid papilla is one of the developmental anomalies that may be found in many children. It is located on the attached gingiva on the lingual aspect of lower canines and typically occurs bilaterally.[19]

Mucocele develops because of mechanical trauma to a minor salivary gland, which is followed by saliva retention and accumulation inside the blocked and dilated excretory ducts of the gland.[20]

Ranula shows many clinical similarities with mucocele. It is caused by trauma to the excretory duct of the salivary glands located in the floor of the mouth and is manifested as swelling. It is very uncommon in newborns.[21]

White lesions near rough dental restorations, a sharp tooth, or due to biting because of unsuitable prosthesis were registered as frictional keratosis. The occurrence of frictional keratosis was in of all studied subjects.[22]

The prevalence of irritational fibroma in given study was 0.84%. It was more prevalent in males than in females. This is in accordance with the study done by authors where the prevalence was found to be 1%.[23]

Atopic dermatitis, asthma and allergic rhinitis are chronic diseases that are common in infants and the allergic disease prevalence in globally has been consistently increasing.[24]

The increase in allergic diseases has been an important public health problem in society because these diseases cause sleep disorders, impede growth, disrupt education.[25]

Because the prevalence of allergic diseases is closely related to age and dependent on the type of allergic disease, the symptoms manifest at different ages.[26]

Traumas might be the easiest causes to be identified: They may be thermal, chemical or mechanical and arise from direct application of heat, acidity or pressure.[27]

Mucosal damage is the most common acute side effect experienced by patients undergoing radiation therapy of the head and neck.[28]

The term 'aphthous stomatitis' has been used interchangeably with 'aphthous ulcers', but at present, the term aphthous stomatitis is preferred.[29]

It is a common disease, affecting about 20% of the general population, in children the estimated prevalence is 9%.[30]

Due to the high prevalence medical and dental professionals are repeatedly confronted with paediatric patients complaining about oral ulcers, but the diversity of causative factors can make a diagnosis challenging.[31]

Causes can range from infections to allergies, nutritional deficiencies, autoinflammation, genetics or can be drug induced, therefore children with oral ulcers are often treated by general paediatricians, dentists.[32]

Pediatric oral pathology encompasses a diverse group of entities that range from exceedingly common to the point of being considered a normal anatomic variant to exquisitely rare.[33]

In oral pathology, 8.2% of oral biopsies are received from patients less than 16 years of age, but this will vary between diagnostic service departments.[34]

If considered a tumor, rather than a hamartoma, odontomas are the most common odontogenic tumor. One series looking at 2114 pediatric oral biopsies, found odontomas as the most common entity encountered with squamous papillomas next most frequent.[35]

Odontomas are most frequently asymptomatic intraosseous lesions diagnosed in the second decade of life, often detected radiographically during investigation of delayed tooth eruption.[36]

A dental follicle normally surrounds a developing tooth prior to eruption, but it may become enlarged with fluid accumulation between the epithelium and the crown or inflamed.[37]

Hyperplastic dental follicles represent 5.5%–6.3% of all pediatric lesions submitted for biopsy and 18.9% of nonneoplastic oral pathologies in pediatric patients, more common in the 10–19-year age range with a mean age of approximately 13 years.[38]

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Eruption cyst is the soft tissue counterpart of a dentigerous cyst, sometimes is referred to as an eruption hematoma.[39]

Clinical Presentation Eruption cysts are pediatric developmental cysts that present clinically as a translucent to bluish, dome-shaped swelling over the permanent or less commonly.[40]

The incidence of OMLs among children has been established at 5.21%. The most frequently observed pathology were aphthae.[41]

Most of the patients were males and children in the age of 7–13 years (mean age of children was around 8 y/o).[42]

In boys, erosions and ulcers resulting from trauma were observed significantly more often. In preschoolers (0–6 y/o) geographic tongue was significantly more often diagnosed.[43]

Also, while *Morsicatio buccarum* was significantly more often observed in school-aged children and adolescents (7–13, 14–17 y/o).[44]

Knowledge about the prevalence of mucosal pathology in children is essential and fundamental for the medical practitioners for the appropriate diagnosis and treatment.[45]

Pediatric OMLs often present with unique or misleading features that require specific training to differentiate between benign developmental conditions and serious systemic diseases.[46]

The frequency and type of lesions vary significantly between infants, children and adolescents, often deviating sharply from the patterns seen in adults or the elderly.[47]

By identifying which groups are most at risk, health authorities can design targeted screening programs and preventive interventions tailored to the specific needs of younger populations.[48]

Current data is often fragmented; comprehensive regional research will provide the necessary baseline to evaluate the true burden of oral disease in children.[49]

Detailed epidemiological insights serve as the foundation for future health policy. This allows for the efficient allocation of resources and the creation of specialized healthcare services that ensure long-term oral health from an early age.[50]

Limitations

This systematic review has several limitations that should be considered while interpreting the findings. First, the number of included studies was limited, which restricts the strength and generalizability of the conclusions. The included studies demonstrated heterogeneity in study design, sample size, diagnostic criteria and age stratification, making direct comparison challenging.

Second, variability in the definition and classification of oral mucosal lesions across studies may have introduced measurement bias. Some studies lacked standardized diagnostic protocols, which could affect the accuracy of reported prevalence.

Third, the inclusion of studies with moderate to high risk of bias, particularly those with incomplete reporting or unclear sampling methods, may have influenced the overall findings. Additionally, publication bias could not be formally assessed due to the small number of studies, which may result in overrepresentation of studies reporting higher prevalence.

Finally, the restriction to English-language publications and selected databases may have led to the exclusion of relevant studies, thereby introducing selection bias. These limitations highlight the need for cautious interpretation of the results.

Implications for Future Research and Practice

The findings indicate the need for standardized epidemiological studies focusing on oral mucosal lesions in pediatric populations. Future research should adopt uniform diagnostic criteria, larger sample sizes and multicentric designs to improve comparability and reliability of prevalence estimates.

From a clinical perspective, early identification of oral mucosal lesions is essential, as some conditions may serve as indicators of underlying systemic diseases. Incorporating routine mucosal examination into pediatric dental assessments may improve early diagnosis and management.

At the policy level, region-specific epidemiological data are required to develop targeted preventive programs and oral health strategies. Future studies should also explore longitudinal patterns of lesion progression and the role of

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socioeconomic and environmental determinants in pediatric oral health.

Registration and Protocol

This systematic review was not registered in any prospective database such as PROSPERO. A predefined protocol was followed during the conduct of the review to minimize bias.

List of Abbreviations

1. **OML** – Oral Mucosal Lesions
2. **PRISMA** – Preferred Reporting Items for Systematic Reviews and Meta-Analyses
3. **STROBE** – Strengthening the Reporting of Observational Studies in Epidemiology
4. **GRADE** – Grading of Recommendations Assessment, Development and Evaluation
5. **RAS** – Recurrent Aphthous Stomatitis

Conclusion

Different oral mucosal lesions (OMLs) impact the orofacial region. Seven oral possibly malignant illnesses specifically impact the oral mucosa. Other OMLs include a variety of cysts, benign and malignant tumors, inflammatory lesions, lesions linked to tobacco use, areca nut consumption, betel nut chewing and other conditions; immune-mediated lesions such as oral pemphigus and recurrent aphthous stomatitis (RAS), which are difficult to treat and could be fatal if early diagnosis is not made. These lesions interfere with eating, causing pain, burning sensations, facial asymmetry and other problems that disrupt daily routines. As advised by the World Health Organization, examining the prevalence of OMLs population groups are crucial for bettering oral prevention and wellness programs for age groups as well as for understanding the disease's characteristics and extent. The state of the teeth, mucous membranes, periodontal tissues and tongue collectively is referred to as oral health. Clinicians and academics generally believe that this idea of dental and oral health is restricted to periodontal disorders and carious teeth. According to this perspective, dentists typically overlook conditions affecting the oral mucosa. Most recent studies either included lesions in a specific anatomical region or concentrated on a single lesion. Furthermore, there are even fewer research on oral mucosal ulcers in the pediatric population. As far as we are aware, no comparable decision tree currently exists. We intend to demonstrate its reproducibility and reliability in the pediatric dentistry department of Rothschild Hospital in Paris. Validation is necessary for any novel clinical tool, but it is especially important for our decision tree because the papers we chose have very little evidence. This is obviously a feature of the field of study, but it also raises the possibility of bias. To establish the frame of use for our decision tree, we must assess its clinical validity. Its extrinsic validity and intrinsic validity must next be examined in actual clinical settings.

Funding

No funding was received for this study.

Competing Interests

The authors declare that there are no competing interests related to this study.

Data Availability

The data supporting the findings of this study are derived from publicly available published articles. Extracted data and analysis are available from the corresponding author upon reasonable request.

Author Contributions

- Dr. Niraimathi Gnanasekaran: Conceptualization, literature search, data collection, manuscript drafting
- Dr. Karthik Shunmugavelu: Study design, data interpretation, critical revision of manuscript, supervision

All authors reviewed and approved the final version of the manuscript.

Author Biographies

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Ireland. His research focuses on oral pathology, epidemiology and translational diagnostics.

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