Management Considerations for Pediatric Oral Pathology

Latest Revision
2025

Abbreviations

HPV: Human papilloma virus.
HSV: Herpes simplex virus.
Majr: Medical subject heading major topic.
Tiab: Title and abstract.

Abstract

Comprehensive oral examination includes thorough evaluation of all oral tissues and documentation of unusual findings. This best practice describes clinical characteristics of oral lesions or conditions that are common *to infants, children, and adolescents and establishes diagnostic criteria, surgical interventions, and pharmacologic options for their management. Detailed medical and dental histories and assessment of signs and symptoms are critical to developing a working diagnosis. Biopsy and histopathologic analysis of suspicious lesions can establish a definitive diagnosis. The need for either surgical or pharmacologic intervention is dependent on multiple factors, including etiology, symptoms, recurrence, and prognosis. While most lesions are mucosal conditions, developmental anomalies, or inflammatory lesions, practitioners should be vigilant for neoplastic diseases.*

This document was developed through a collaborative effort of the American Academy of Pediatric Dentistry Councils on Clinical Affairs and Scientific Affairs to offer updated information and guidance on management considerations for pediatric oral pathology.

KEYWORDS: BIOPSY; MUCOSAL LESION; NEWBORN CYSTS; VIRAL INFECTION; APHTHOUS ULCERS

Purpose

The American Academy of Pediatric Dentistry intends this document to describe clinical presentation. diagnostic processes, and management of oral pathologic conditions common to the pediatric population. Etiology, disease course, and prognosis are discussed to inform clinical decision making about surgical interventions and pharmacologic treatment.

Methods

Recommendations on management considerations for pediatric oral surgery, which included oral pathology, were developed by the Council on Clinical Affairs, adopted in 2005,[1] and last revised in 2020.[2] This revision, separating oral pathology from oral surgery, is based on a review of current dental and medical literature related to pediatric oral pathology, including a search of the PubMed®/MEDLINE database using the terms: (*dental care for children* [Majr] OR *evidence based dentistry* [Majr] OR *pediatric dentistry* [Majr]) AND (*hand, foot and mouth disease*) [Tiab], OR (*pathology, oral*) [Majr] OR *cone beam computed tomography* [Majr] OR *CBCT* [Tiab] OR *surgery, oral* [Majr] OR *oral surgical procedures* [Majr] OR *oral mucocele** [Tiab] OR *dental lamina* [Tiab] OR *natal teeth* [Tiab] OR *neonatal teeth* [Tiab] OR *localized juvenile spongiotic gingival hyperplasia* [Tiab] OR *eruption hematoma* [Tiab] OR *gingival cyst* [Tiab] OR *Epstein pearls* [Tiab] OR *Bohn's nodules* [Tiab] OR *gingival neoplasm** [Tiab] OR *newborn congenital epulis* [Tiab] OR *squamous papilloma* [Tiab] OR *oral verruca vulgaris* [Tiab] OR *irritation fibroma* [Tiab] OR *recurrent aphthous stomatitis* [Tiab] OR *pyogenic granuloma* [Tiab] OR *herpetic lesion** [Tiab] OR *aphthous ulcer** [Tiab] OR *HSV* [Tiab] OR *simplex virus* [Tiab] OR *HSV infection** [Tiab] OR *trauma-associated lesion** [Tiab] OR *benign migratory glossitis* [Tiab] OR *candidiasis* [Tiab] OR *mucocele* [Tiab] OR *fibrous lesion** [Tiab] OR *granuloma, pyogenic* [Tiab] OR *dental sac* [Tiab] OR *human papilloma virus* [Tiab] OR *HPV* [Tiab] OR *HPV lesion** [Tiab] OR *chronic inflammation* [Tiab] OR *giant cell lesion** [Tiab] OR *hyperkeratosis* [Tiab] OR *peripheral ossifying fibroma* [Tiab] OR

gingivitis [Tiab] OR *gingival hyperplasia* [Tiab] OR *hemangioma* [Tiab] OR *ulcer* [Tiab] OR *candida* [Tiab]).One hundred eighty-eight articles matched these criteria. Papers for review were chosen from this list and from references with selected articles. When data did not appear sufficient or were inconclusive, recommendations were based upon expert and/or consensus opinion by experienced researchers and clinicians.

** Used in the PubMed search to identify all terms that begin with this truncated base.*

Background

A wide spectrum of soft and hard tissue oral and maxillofacial lesions occurs in infants, children, and adolescents. Based on clinical studies, the most frequently observed oral mucosal lesions in children, adolescents, and young adults are aphthous ulcerations, herpes simplex virus (**HSV**) infections, trauma-associated lesions, benign migratory glossitis, and candidiasis.[3] The most frequently biopsied oral mucosal lesions are: mucocele, fibrous lesions, pyogenic granuloma, dental follicle, human papilloma virus (**HPV**) lesions, gingival hyperplasia, hemangioma, and ulcers.[3] Recognition of these lesions and other pathologic oral conditions in children is critical to ensure correct diagnosis, timely interventions/management, and referral to other health care professionals as indicated. Some lesions may recur or have potential for malignant transformation; vigilance for neoplastic diseases is imperative.

Regardless of the age of the child, establishing a working diagnosis for every lesion is necessary. This is accomplished by obtaining a thorough history, assessing the risk factors, and documenting the clinical signs and symptoms of the lesion. In making a list of differential diagnoses, consideration is given to a variety of lesions with similar characteristics. The entity that is judged to be the most likely condition becomes the working diagnosis and directs the initial management approach. When lesions are deemed likely to be self-limiting, the dentist determines the intervals at which follow up examination is necessary to monitor changes in appearance and resolution.

For some oral lesions, including those that are thought to not be self-limiting, are suspected to be malignant, or do not response to empirical medication regimens, a biopsy may be needed. A definitive diagnosis is best made by performing either an excisional or incisal biopsy. Fine needle aspiration or cytobrush techniques are considered adjunctive tests because they do not establish a definitive diagnosis.[4,5] In general, a soft tissue biopsy should be performed when a lesion persists for greater than 2 weeks despite removal of the suspected causative factor or empirical drug treatment. Many oral biopsies are within the scope of practice for a pediatric dentist to perform. Careful technique, including removal of adequate amount (in both size and depth) of tissue and placement of the specimen in a fixative (eg, 10% formalin) to preserve the tissue for histological analysis, is necessary.[4-7]

A histopathologic examination of any tissue removed from the oral and maxillofacial region is the standard of care, particularly when there is suspicion for disease or neoplasm.[6] Exceptions to this rule include carious teeth that do not have soft tissue attached, extirpated pulpal tissue, and clinically normal tissue, such as tissue from gingival recontouring.[6] Gross description of all removed tissue is entered into the patient record to verify consistency with a histopathology report. Clinical photographs and radiographs also are useful for correlating with microscopic findings. Histopathologic examination not only furnishes a definitive diagnosis, but it provides information about clinical behavior and prognosis and determines the need for additional treatment or follow-up. This allows the clinician to deliver evidence-based medical/dental care, increasing the likelihood of successful treatment.[7]

Recommendations

Oral conditions occurring in newborns and infants

Natal and neonatal teeth

Natal and neonatal teeth can present a challenge when deciding on treatment. Natal teeth have been defined as those teeth present at birth, and neonatal teeth are those that erupt during the first 30 days of life.[8,9] The teeth most often affected are the mandibular primary incisors.[10] In most cases, anterior natal and neonatal teeth are part of the normal complement of the dentition.[8,9] Natal or neonatal molars have been identified in the posterior region and may be associated with systemic conditions or syndromes (eg, Pfieffer syndrome,

chondroectodermal dysplasia).[11,12] Because root development is incomplete at the time of eruption, some degree of mobility is expected.[8,9]

Riga-Fede disease is an ulcerative condition caused by the natal or neonatal tooth rubbing the ventral surface of the tongue during feeding.[11,13] Pain and discomfort arising from the condition may result in dehydration and inadequate nutritional intake for the infant.[8,11]

Treatment considerations: If there are no concerns for feeding, pain, or aspiration, natal and neonatal teeth should be preserved and maintained in a healthy condition.[8,9,11] Close monitoring is indicated to ensure that the tooth remains stable over time. Treatment of Riga-Fede disease should be conservative and focus on creating round, smooth incisal edges.[8,9,11] If conservative treatment does not correct the condition, the infant is having associated feeding difficulties, or the teeth are mobile and deemed an aspiration risk, extraction is the treatment of choice.[8,9,11,12] .[14(pg16)]

Developmental cysts

Developmental cysts of the newborn typically present as asymptomatic 1 to 3 mm papules.[14(pg16)] They are smooth, whitish in appearance, and filled with keratin.[14(pg16),15] Palatal cysts of the newborn include Epstein pearls and Bohn's nodules.[14(pg16),15] Epstein pearls occur in the median palatal raphe area as a result of trapped epithelial remnants along the line of fusion of the palatal halves.[14(pg16),15] Bohn's nodules are remnants of salivary gland epithelium and usually are found at the junction of the hard and soft palates or on the buccal and lingual aspects of the alveolar ridge away from the midline.[16] Gingival cysts of the newborn, or dental lamina cysts, are found on the crests of the dental ridges and are most commonly are seen bilaterally in the region of the first primary molars, especially in the maxilla.[14(pg16),15] They result from remnants of the dental lamina.

Treatment considerations: No treatment is needed, as these cysts usually disappear or rupture during the first 3 months of life.[14(pg16)]

Congenital epulis of the newborn

Congenital epulis of the newborn is a rare benign tumor seen only in newborns.[17(pg101)] This lesion is typically a single protuberant nodule arising from the gingival mucosa. It is most often found on the anterior maxillary ridge.[17(pg101)-19] Patients typically present with feeding and/or respiratory problems.[19] Congenital epulis has a marked predilection for females.[17(pg101)]

Treatment considerations: Treatment normally consists of surgical excision,[18,19] however, there have been reports of spontaneous regression of untreated congenital epulis.[17(pg101)] Lesions smaller than 2 cm in diameter may be monitored as long as they do not cause feeding problems or airway interference.[17(pg101)] Congenital epulis seldom recurs after excision.[17(pg101)]

Lesions occurring in children and adolescents

Oral candidiasis

Oral candidiasis is a relatively common fungal infection in infants, children, and adolescents.[20(pg966)] It may be an acute or chronic condition and usually appears as white papules or plaques covering the oropharyngeal mucosa which, if removed, leave an underlying surface that appears erythematous or atrophic. Symptoms (eg, burning sensation) and location (eg, tongue, buccal mucosa, palate)[14(pg14)] can vary, and other clinical features can be impacted by systemic factors (eg, medications, immunosuppression, endocrine levels, nutritional deficiencies).[21(pg201)] Secondary fungal infection may occur in immunocompromised individuals or in those who are taking certain medications, including antibiotics, corticosteroids, or xerostomia-causing drugs.[20(pg966)] Clinical forms of oral candidiasis include pseudomembranous (thrush), erythematous, central papillary atrophy (median rhomboid glossitis), chronic multifocal, denture stomatitis (ie, chronic atrophic candidiasis), hyperplastic (ie, candida leukoplakia), mucocutaneous, and endocrine-candidiasis syndromes.[21(pg201)]

Treatment considerations: Candidiasis may be monitored for resolution, in healthy infants and children if asymptomatic.[20(pg968)] Identification of contributing factors are important to prevent recurrences.[20(pg968)] Children who are immunocompromised or those who have persistent or recurrent and symptomatic oral disease require treatment with topical or systemic medications (e.g. nystatin, fluconazole, miconazole).

[20(pg968),21(pp208,209)-23] Consultation with an oral medicine specialist, pediatrician, or infectious disease specialist may aid in management.

Coxsackievirus oral infections

Coxsackieviruses cause a variety of illnesses (eg, hand-foot-mouth disease, herpangina) common in children under 10 years of age.[20(pg956)] These conditions can present significant oral manifestations (ie, erythema, oral ulcerations) accompanied by systemic signs and symptoms (eg, fever, myalgia) which are self-limiting and resolve within 10 days.[24]

Treatment considerations: Management strategies include anti-pyrectics and palliative care (eg, analgesics, fluids).[24] Currently, there are no effective antiviral agents for hand-foot-mouth disease or herpangina.[20(pg956)]

Herpes simplex virus oral infection

Most primary HSV-1 infections are subclinical.[20(pg962),25(pg293] Primary herpetic gingivostomatitis is the most common symptomatic presentation of an initial HSV infection.[14(pg25)] It presents as erythematous gingiva, bleeding mucosa, and clusters of small vesicles throughout the mouth. Somatic signs may include fever, malaise, lymphadenopathy, and difficulty with eating and drinking.[14(pg25)] Reactivation of HSV-1 can cause clusters of recurrent herpetic vesicles to appear periorally (herpes labialis) or intraorally.[14(pg24)]

Treatment considerations: Primary herpetic gingivostomatitis is self-limiting. Symptoms typically resolve within 2 weeks, and lesions heal without scarring.[26] Treatment is supportive care (eg, hydration, analgesics), and good hand-hygiene can help avoid autoinoculation. Topical anesthetics and topical antiviral agents (eg, acyclovir) may be prescribed for herpes labialis.[14(pg24),27] Systemic antivirals are administered for those who are immunocompromised.[14(pg24)]

Human papilloma virus infections

The most common HPV oral infections in children are squamous papilloma and verruca vulgaris.[14(pg30)] Lesions caused by sexually-transmitted HPV strains (eg, condyloma acuminata) are found less commonly in children.[17(pg98)] Vigilance for these lesions is necessary as they have a high occurrence rate and may raise suspicion for child abuse.[14(pg30),20(pg967)] HPV vaccination can significantly reduce the risk of HPV infection, a critical factor in the development of oral squamous cell carcinoma, and is recommended for children as young as 9 years old.[28]

Squamous papilloma is a benign lesion caused by HPV types 6 and 11.[17(pg98)] Squamous papilloma presents as painless, pink to white, pedunculated (stalked) lesions. The surface often displays multiple fingerlike projections.[17(pg98)] These lesions can occur anywhere in the oral cavity, but the tongue, labial mucosa, and soft palate are the most common sites.[14(pg30)]

Treatment considerations: Excision is the treatment of choice, and recurrence is uncommon.[14(pg30),17(pg98)] Although they are viral in origin, their infectivity is low.[14(pg30)] Squamous papilloma has no risk of malignant transformation. [14(pg30)]

Verruca vulgaris, or the common wart, is a lesion induced by HPV types 2, 4, 6, and 40 and generally found on the skin of the hand.[14(pg30)] Finger or thumb sucking can cause autoinoculation resulting in the development of intraoral lesions.[14(pg30)] The most common oral sites are vermillion border of the lip, tip of the tongue. labial mucosa, and the palate.[14(pg30),17(pg98)] Verruca vulgaris is similar in appearance to the squamous papilloma, with a pink or white stippled surface.[14(pg30),17(pg98)]

Treatment considerations: Excision of the entire lesion is recommended; recurrence is uncommon.[14(pg30)] There is no risk of malignant transformation.[14(pg30)]

Recurrent aphthous ulcerations

Recurrent aphthous ulcerations, which occur in 20% to 30% of children,[3,14(pg24)] are painful lesions found primarily on nonkeratinized mucosa.[14(pg24),25(pg296)] Three variants of aphthous ulcers are recognized:

1. Minor aphthous ulcerations. Minor aphthous ulcerations are the most common form, accounting for almost 80% of cases of recurrent aphthous stomatitis.[3] They have a yellowish-white membrane

and are surrounded by an erythematous halo. These ulcers are 3 to 10 mm in diameter. One to 5 ulcers often present during a single outbreak, and they heal in 7 to 10 days without scarring.[14(pg24)]

2. Major aphthous ulcerations. Major aphthous ulcerations are larger (>1 cm).[14(pg24)] The major aphthous ulcer can resolve in 2 to 6 weeks with potential scarring.[14(pg24)]
3. Herpetiform aphthous ulcerations. When multiple aphthous ulcerations present in a single occurrence, they are described as herpetiform.[14(pg24)] Herpetiform aphthous ulcers heal without scarring.[14(pg24)]

Treatment considerations: Pain from recurrent aphthous ulcers may be alleviated with topical anesthetics.[14(pg24)] Corticosteroids often are the first line of treatment, and the choice of steroid (potency, systemic versus topical) is based on the severity of the condition.[14(pg24)] Other treatment options include chlorhexidine rinses, laser treatments, and nutritional supplements.[14(pg24),20(pg969)]

Benign migratory glossitis

Benign migratory glossitis, also known as erythema migrans or geographic tongue, is a benign chronic inflammatory condition of the filiform papillae. The conditions presented as a changing pattern of multiple oral or circular red patches surrounded by yellow to white borders. The most observed site is on the dorsal and lateral surface of the tongue.[14(pg20)] The condition may be associated with fissured tongue, psoriasis, and atopic dermatitis.[29,30]

Treatment considerations: Benign migratory glossitis generally is asymptomatic, and no treatment is required. If a patient complains of discomfort (usually very mild), avoidance of triggers (eg, food sensitivities)[31] and use of topical corticosteroids may be beneficial.[32]

Irritation fibroma

The irritation fibroma is a reactive lesion occurring as a response to chronic trauma of the mucosa.[17(pg99)] The irritation fibroma presents as a firm nontender pink nodule and is composed of fibrous connective tissue.[33] The lesion does not exceed 2 mm in diameter.[33] The irritation fibroma can be found on buccal and labial mucosa, the tongue, and attached gingiva.

Treatment considerations: Excisional biopsy is recommended.[17(pg99)] These can recur if the source of the irritation is not removed.[33]

Mucocele[33]The mucocele is a common lesion in children and adolescents resulting from the rupture of a minor salivary gland excretory duct (often due to trauma), with subsequent leakage of mucin into the adjacent connective tissues that later may be surrounded in a fibrous capsule.[14(pg32)] Most mucoceles are well-circumscribed blue, red, or translucent fluctuant swellings that are frequently found on the lower lip.[14(pg32),17(pg102)] Other sites where mucoceles commonly present include the buccal mucosa, ventral surface of the tongue, and floor of the mouth (known as a ranula).[14(pg32),17(pg102)]

Treatment considerations: No treatment is advised for superficial and small (≤3 mm) mucoceles as they will resolve spontaneously.[3] Patients should be advised to avoid picking, biting, or otherwise traumatizing the mucocele to prevent enlargement. Larger mucoceles require surgical excision to minimize the risk of recurrence.[3] The risk of recurrence is increased with incomplete removal, marsupialization, and retention of the offending minor salivary glands.[3,14(pg32)]

Eruption cyst

The eruption cyst (also known as eruption hematoma) is a soft tissue cyst that results from a separation of the dental follicle from the crown of an erupting tooth.[14(pg21)] Eruption cysts most commonly are associated with erupting first permanent molars and maxillary incisors.[14(pg21)] The color of these lesions can range from normal to blue-black or brown, depending on the amount of blood in the cystic fluid.[14(pg21),17(pg111)]

Treatment considerations: Because the tooth erupts through the lesion, no treatment is necessary.[3,17(pg111)] If the cyst continues to enlarge and causes discomfort (usually during mastication), the roof of the cyst may be removed surgically (eg, marsupialization).[14(pg21)]

Pyogenic granuloma
Pyogenic granuloma is a reactive oral mucosal condition most common in children and young adults and during pregnancy.[14(pg33)] The pyogenic granuloma is a painless smooth or lobulated vascular lesion with or without an ulcerated surface that bleeds easily.[14(pg33)] Pyogenic granuloma most commonly occurs on maxillary anterior attached gingiva but can be found on tongue, lower lip, buccal mucosa, or skin.[14(pg33)]
Treatment considerations: Treatment is complete excision with the removal of the source of irritant.[14(pg33)] This lesion can recur in 3% to 15% of cases.[14(pg33)]

Localized juvenile spongiotic gingival hyperplasia
Localized juvenile spongiotic gingival hyperplasia is thought to be an isolated patch of sulcular or junctional epithelium that is subjected to local factors such as mouth breathing or orthodontic appliances.[14(pg31)] The lesion presents as an isolated bright red velvety patch or enlargement of anterior facial free gingiva margin. This lesion is painless but bleeds easily and does not respond to oral hygiene measures.[34] While rare, a multifocal or generalized spongiotic gingival hyperplasia also may occur.[35] This may be confused with puberty gingivitis, pyogenic granuloma, or squamous papilloma.[35]
Treatment considerations: Surgical or laser excision is the most frequently reported treatment of choice; up to 16% of lesions will recur.[14(pg31)] However, spontaneous resolution may occur.[35]

Periodontal disease
Gingivitis, periodontal disease, and other periodontal conditions (eg, pericoronitis, traumatic gingival and oral mucosa lesions) can affect children. Refer to the American Academy of Pediatric Dentistry's *Periodontal Conditions in Pediatric Dental Patients* for a more detailed discussion on the diagnosis, risk assessment, and management of these conditions.[36]

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