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REVIEW

Various Benign and Pathological Lesions of Oral Cavity in Pediatric Patients

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ABSTRACT

Oral soft tissue lesions in pediatric patients can be congenital or developmental. They can be asymptomatic and are observed during routine pediatrician or dentist examinations. Some of the lesions become symptomatic and present as an acute care visit. Initial examination and treatment of acute symptoms are done by a pediatrician, and a few of them may need referral to a dentist for definitive treatment such as removal of the lesion. Some lesions are more prevalent in patients of certain ethnicities, age groups, and sex of the patient. Treatment of oral lesions in pediatric patients differs as some lesions are self-limiting, regress spontaneously, and no treatment is needed. Lesions that recur and remain persistent need further investigation, such as a biopsy, followed by cytopathology and culture sensitivity tests. Oral lesions are usually limited to the oral cavity, but bigger lesions may spread locally and out of the oral cavity, involving lymph nodes. Soft tissue lesions can be of bacterial, viral, fungal, or unknown etiology. Identifying and treating these lesions may prevent the risk of systemic involvement and immunological responses. This article provides an overview of different benign and pathological oral conditions in pediatric patients, as well as their diagnoses and management. It highlights the importance of differentiating benign and complicated conditions to guide the specific treatments.

Keywords: Benign oral lesions, Epstein pearl, Hand Foot Mouth disease, Herpangina.

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1. Introduction

Various soft tissue oral cavity lesions are present in pediatric patients right from the newborn age. It is very important to differentiate between benign and severe lesions. Benign lesions may not need any treatment at all as they could be self-limiting, could be a normal finding in newborn patients, and only observation and monitoring of the lesion may be necessary. On the other hand, prompt identification and management of severe lesions must be done to prevent complications. Both pediatricians and dentists play a major role in diagnosing and managing lesions [1].

Various benign and pathological lesions occur in the oral cavity, which are specific to the dental, gingival, and rest of the oral mucosa. A conservative approach to identifying and treating these soft tissue oral lesions in children can be achieved through a thorough clinical examination, a detailed history, and interviews with the parent and child [2].

This article suggests an approach to treating benign and pathological oral lesions in pediatric patients.

2. Discussion

2.1. Oral Conditions

2.1.1. Congenital Epulis of the Newborn

It exclusively affects newborn infants with a predominance of females. It is rare and occurs mostly on the anterior alveolar ridge of the maxilla. The mandibular anterior alveolar ridge is less frequently involved. Clinically, it may present as a pedunculated mass. It is benign and may sometimes undergo spontaneous involution. If it is causing problems in feeding and respiration, surgical excision is recommended. With a possible recurrence, spontaneous regression may occur in most cases, and no treatment is needed [3].

2.1.2. Epstein Pearls

They present as remnants of epithelial tissue trapped along the raphe during the process of fetal growth. No treatment is needed. Lesions regress spontaneously a few weeks after birth [4].

2.1.3. Bohn's Nodules

These are the remnants of mucous gland tissue histologically different from Epstein's pearls found on the alveolar ridges and sometimes on the palate. They regress a few weeks after birth, and no treatment is needed [5].

2.1.4. Dental Lamina Cysts

They originate from remnants of the dental lamina and are found on the maxillary and mandibular alveolar ridges. They regress a few weeks after birth, and no treatment is needed [5].

2.1.5. Eruption Cyst

It is associated with an eruption of the tooth. It appears bluish and translucent and usually has painless swelling that overlies an erupting tooth. No specific treatment is needed. Maintaining good oral hygiene is recommended. An eruption cyst is also called an eruption hematoma [6].

2.1.6. Mucocele

Its common sites of occurrence are the lower lip and the floor of the mouth but it can occur over the upper lip as well. Extravasation of mucus into the fibrous connective tissue from a minor salivary gland can lead to the formation of a cyst-like cavity, a mucocele. Surgical excision of the involved gland is recommended for treatment. Marsupialization is not the preferred treatment option as it may result in recurrence [1].

2.1.7. Ranula

Its formation is associated with submaxillary and submandibular salivary glands. The commonest site of occurrence is the floor of the mouth. It is formed when mucus is retained by the epithelial lining of a salivary gland duct, and a retention cyst is formed. Clinically, it may present as a small fluctuant mass. Treatment is marsupialization. Recurrence may need excision of the gland [7].

2.1.8. Ankyloglossia

It (tongue tie) is characterized by a short lingual frenum, which extends from the tip of the tongue to the floor of the mouth and attaches to the lingual gingival tissue. The short frenum restricts tongue movement and can interfere with speech. In younger patients, surgical treatment may become necessary if it interferes with the infant's feeding. Treatment in older children is recommended only if ankyloglossia is leading to speech difficulties [8].

2.1.9. Abnormal Labial Frenum

It can cause midline diastema of the upper central incisors. Midline diastema is normal during the eruption of maxillary central incisors, and space is closed eventually after the eruption of maxillary central and lateral incisors. It may originate at the midline on the inner surface of the lip. A frenectomy may be performed when it interferes with speech, hygiene, and teeth brushing [9].

2.1.10. Acute Herpetic Gingivostomatitis

It caused by the Herpes Simplex Virus type 1, is a contagious oral infection that primarily affects children under five years of age. It may manifest as one or two mild sores on the oral mucous membrane, which can go unnoticed until the condition worsens and causes systemic symptoms. Patients may develop red gingival tissues, malaise, irritability, headache, and pain while eating especially acidic foods. A distinctive oral finding is the presence of liquid-filled vesicles, which may rupture and form painful ulcers, covered with a whitish-grey membrane and surrounded by inflammation. Ruptured vesicles with areas of inflammation may cover the entire buccal mucosa. Supportive treatment is the mainstay with rest, isolation, hydration, a soft diet, and topical lidocaine application. Equal parts of diphenhydramine, elixir, and Kao pectate can be mixed to use as an alternative to lidocaine. After the initial infection, the virus remains dormant for periods of time in sensory nerve ganglia, which may later reappear as cold sores, usually on the outside of the lip, known as "Recurrent Herpes Labialis." The reappearance of these cold sores can be triggered by emotional stress, excessive exposure to sunlight, or irritation from the rubber dam material used during dental procedures. Recurrent Herpes Labialis can be treated by the application of acyclovir 5% ointment [10].

2.1.11. Herpangina

It is a sporadic outbreak of the coxsackie virus, has been reported in various regions of the United States, particularly affecting young and older children and occasionally adults. It is predominantly a summer disease. Children may carry the virus and remain asymptomatic. Usually, children present with mild symptoms such as a sore throat, low-grade fever, and headaches. Gastrointestinal symptoms may also occur. Clinically, lesions present as small ulcers with a red base over anterior faucial pillars, which may extend to the hard and soft palate, the posterior pharyngeal wall, the buccal mucosa, and the tongue. Sometimes, these ulcers can cause pain while eating, and children may have poor oral intake. Encouragement of fluids, a soft diet, and avoiding acidic foods may help keep children hydrated. The lesions heal within a few days to a week. The incubation period is likely 2–10 days, and children may be affected multiple times in a season by different strains of coxsackie virus. No treatment is necessary, and the disease is usually self-limiting. However, rare systemic complications can arise [11].

2.1.12. Hand, Foot, and Mouth Disease

It primarily affects young children less than 5 years of age. Patients present with maculopapular, exanthematous, and vesicular skin lesions, which typically appear on the oral mucosa, hands, feet, legs, arms, and occasionally the buttocks. Skin rash may be associated with other systemic symptoms such as anorexia, a low-grade fever, a sore throat, sometimes lymphadenopathy, diarrhea, nausea, and vomiting. Oral lesions may become painful, leading to a refusal to eat. The tongue and hard

palate also exhibit redness and swelling. Usually, it is self-limiting, and no specific treatment is necessary. Patient management involves isolation, rest, adequate fluid intake, and the use of magic mouth rinses. Differential diagnosis includes herpetic gingivostomatitis, herpangina, erythema multiforme, recurrent aphthous ulcers, and animal foot and mouth disease [12].

2.1.13. Acute Lymph Nodular Pharyngitis

It is another oral condition that is common in children and young adults and rare in older individuals. The primary symptoms include a sore throat, ranging from mild to severe, accompanied by a mild to moderate fever, a mild headache, and anorexia. Notably, children with this condition often do not experience rhinorrhea, cough, tracheitis, otitis media, or lymphadenopathy. The duration of the symptoms varies from 4 to 14 days, and the oral lesions typically resolve within 6 to 10 days, leaving behind a ring of fading erythema that persists for several days. Typical lesions are raised, distinct, whitish-to-yellow solid papules that are surrounded by a narrow zone of erythema. Lesions may present on the uvula, soft palate, anterior pillars, and posterior oropharynx. No treatment is necessary, as the condition is self-limiting. While antibiotics are not beneficial, antipyretics are recommended to manage the fever [13].

2.1.14. Recurrent Aphthous Ulcer

It is also known as recurrent aphthous stomatitis. Patients may present with a painful ulceration that develops on the mucous membrane of the mouth. Typically lesions may have a round to oval crateriform base, raised, reddened margins, and cause pain. The duration of these ulcers can vary from 4 to 12 days. Topical application of triamcinolone acetonide can be beneficial in managing the symptoms. Supplementation with multivitamins may help as nutritional deficiencies, such as iron, Vitamin B12, and Folic acid, have been identified in patients with aphthous ulcers. Stress may also serve as a precipitating factor so addressing underlying stressors can be helpful in managing the condition [14].

2.1.15. Human Papilloma Virus (HPV)

Its lesions manifest orally as small, cauliflower-like warts on the tongue, palate, lips, or other mouth areas. They can persist or recur, and surgical excision is recommended in such cases. The virus can affect all age groups through sexual or non-sexual contact. In young children, sexual abuse may be suspected as the cause of transmission of the virus. Vaccination is highly recommended to protect against HPV infection, particularly for individuals aged 9–11 years [15].

2.1.16. HIV

Human Immuno Deficiency Virus, oral candidiasis is the most common oral manifestation of the HIV virus. Other lesions are Linear Gingival Erythema, Median Rhomboid Glossitis, Hairy Leukoplakia, Aphthous stomatitis, Necrotizing Ulcerative Gingivitis, and Periodontitis. If the child is not already diagnosed as HIV positive, the presence of these oral lesions might warrant further investigations to confirm the diagnosis [16].

2.1.17. Oral Candidiasis

It is also known as thrush, manifests as white patches and lesions that can be easily scraped off to reveal an underlying bleeding surface. Conditions that can promote growth of the fungus, such as prolonged antibiotic therapy, the use of pacifiers, and bottle feeding, can cause the development of thrush in young children. To combat this infection, an anti-fungal medication like nystatin is recommended. Neonatal candidiasis, a rare occurrence, develops during vaginal passage and clinically manifests within the first two weeks of life. In breastfed babies, maternal hygiene becomes paramount, particularly breast exams and treatment of any breast lesions [17].

2.1.18. ANUG (Necrotizing Ulcerative Gingivitis) Vincent Infection

It is more prevalent in young adults and uncommon children. Its diagnosis is straightforward due to the involvement of interproximal papillae and the presence of pseudomembranous necrotic tissue. Patients may present with painful gingival bleeding, decreased appetite, elevated fever, general malaise, and a foul odor. The treatment options include curettage and debridement of involved tissue, and the use of mild oxidizing mouth rinses. In severe cases, antibiotics are recommended. Patients are discharged with counseling about oral hygiene practices and the use of oxidizing mouth rinses after each meal for improvement and to prevent the recurrence of the condition. Interestingly, the early stages of Hand-Schuller-Christian Disease or Letterer-Siwe disease are often associated with many of the symptoms of ANUG [18].

2.1.19. Infectious Mononucleosis

It is caused by the Epstein-Barr (EB) virus. While the exact transmission mechanism remains uncertain, deep kissing or intimate oral exchange of saliva is known to play a significant role. Consequently, it's sometimes referred to as the "kissing disease." Clinical symptoms include fever, chills, sore throat, headache, cough, nausea, vomiting, and lymphadenopathy. Splenomegaly and Hepatitis also frequently occur. Pharyngitis and tonsillitis are more common, accompanied by cervical lymph node enlargement extending into the axilla and groin. Notably, most cases in children remain asymptomatic, with a peak incidence during adolescence. Oral manifestations include acute gingivitis, stomatitis, white or gray membrane, palatal petechiae, and occasional oral ulcers. No treatment is necessary, and symptoms can be managed effectively through good oral hygiene, adequate fluid intake, and rest. The disease typically resolves within 2–4 weeks, although rare complications may arise [19].

2.2. Gingival Conditions

2.2.1. Puberty Gingivitis

It is a unique type of gingivitis that occasionally occurs in children during the prepubertal and pubertal stages. Enlargement of the anterior gingiva is observed clinically. The marginal gingiva is affected by prominent, bulbous interproximal papillae significantly larger than the gingival enlargements caused by local factors. Treatment for

TABLE I: Summary of Various Benign and Pathological Oral Soft Tissue Lesions in Pediatric Patients [1]–[22]

Type of oral lesion	Features	Management
Congenital epulis of the newborn	Soft pink reddish over alveolar ridge at birth	Simple surgical excision
Epstein pearls	Cysts on hard palate, gums at birth or shortly after birth	Resolve spontaneously
Bohn's nodules	Nodules along the gum line	Resolve spontaneously
Dental lamina cysts	Developmental cysts Remnants of dental lamina	Resolve spontaneously
Eruption cyst	Cyst associated with eruption of teeth	Removal or drainage is required only if it becomes symptomatic
Mucocele	Trauma to salivary duct	Conservative Removal if symptomatic
Ranula	Mucocele on the floor of the mouth	Excision/laer/marsupialization
Ankyloglossia	Tongue tie with short frenulum	Frenectomy or frenuloplasty
Abnormal labial frenum	Labial frenulum is too thick or short	Frenectomy or frenuloplasty
Acute herpetic stomatogingivitis	Painful, vesicular lesions by HSV viru	Acyclovir, pain control, hydration
Herpangina	Painful ulcers with vesicles by coxsackievirus	Supportive care
Hand-foot mouth disease	Painful ulcers on hands, feet mouth by coxsackievirus,	Symptomatic treatment
Acute lymphonodular pharyngitis	Sore throat, lymph node enlargement	Symptomatic treatment
Recurrent aphthous stomatitis	Painful ulcers	Oral hygiene, pain control, Hydration
Human Papillomavirus (HPV) Lesions	Warty lesions	Surgical removal, laser cryotherapy, or topical treatments
Human Immunodeficiency Virus (HIV)	Severe gingivitis, candidiasis Xerostomia	Antiretroviral therapy (ART) Antifungal treatment for Supportive care
Oral candidiasis	White plaques	Nystatin
Infectious mononucleosis	Sore throat, exudates by Epstein-Barr virus	Supportive care
Necrotizing ulcerative gingivitis	Painful, ulcerated, bleeding gums	Oral hygiene, antibiotics, debridement, pain control
Puberty gingivitis	Gingival inflammation related to hormonal changes	Oral hygiene Professional cleaning Anti-inflammatory agents
Scorbutic gingivitis	Vitamin C deficiency	Dietary history Vitamin C supplementation
Phenytoin-induced gingivitis	Phenytoin induced	Oral hygiene Adjust medication Surgical gingival reduction

puberty gingivitis involves improving oral hygiene, removing local irritants, using root planing, restoring damaged teeth, and providing dietary and nutritional recommendations. In some cases, vitamin C may help [20].

2.2.2. *Phenytoin-Induced Gingival Overgrowth (PIGO)*

It is also known as Dilantin hyperplasia, is a condition observed in patients undergoing prolonged phenytoin therapy. It can lead to various aesthetic concerns, such as excessive gum growth, difficulty chewing, speech impairments, delayed tooth eruption, tissue damage, and secondary inflammation that can result in periodontal disease. There is currently no cure for PIGO. The use of antihistamines, topical antibiotics, and corticosteroids, supplements of folic acid and ascorbic acid, and alkaline mouthwashes are recommended for symptomatic relief [21].

2.2.3. *Scorbutic Gingivitis*

It is a condition linked to Vitamin C deficiency. It differs from gingivitis caused by other reasons especially poor oral hygiene. It usually affects marginal tissues and papillae. Patients may present with severe pain and spontaneous bleeding. 250–500 mg of ascorbic acid supplementation may improve the condition. Low dietary vitamin C intake may cause scorbutic gingivitis so obtaining information about diet and seven-day diet recall can aid in diagnosis. Oral vitamin C administration also improves the condition [22].

Please refer to Table 1 for a summary of benign and pathological oral lesions in pediatric patients.

3. Conclusion

Pediatricians and dentists play unique roles in diagnosis, education, treatment, follow-up visits, and specialist referrals of oral lesions in pediatric patients. Education and training of pediatricians and dentists may be needed for the timely identification, classification, and management of oral lesions. It is crucial to identify benign lesions to avoid unnecessary load on the patient and the healthcare system. At the same time serious oral lesions must be investigated

promptly by performing biopsy and surgical removal as necessary.

Conflict of Interest

Authors declare that they do not have any conflict of interest.

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