



Oral Mucosal Lesions in Children: A Review

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KEY WORDS

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Abstract: The mouth represents the mirror of an individual's health status at all ages. Numerous oral mucosal lesions can be seen in children, therefore, classification was made depending on the lesion's size, color and location. Dental practitioners deal with the oral cavity related lesions, so, classification enhanced their work quality and made the management of the patients easier. Clinical presentation of the oral mucosal lesions in children varies significantly and most of the occasions the cause and the effect can be established with a thorough history and clinical examination. Most of the previous reports described the lesions of oral mucosa in the adult's population and there is a lack of the studies that present these lesions in pediatric patients, therefore, this study focused on the oral mucosal benign lesions and conditions that affect children and provides an overview of the classification and description of such lesions to perform correct diagnosis and management.

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INTRODUCTION

Mucosal lesions in children are common besides dental caries, periodontal diseases and occlusal discrepancies, therefore, it is the oral health-care provider's responsibility to emphasize this subject since the majority of the oral mucosal lesions related epidemiological studies were performed on the adult population^[1].

It is fundamental to achieve thorough and systematic clinical examination to obtain a diagnosis of the oral lesions, oral soft tissues examination in children should involve the knowledge of its normal size, shape, color and texture of comprising structures, the careful

exploration of the oral mucosa can provide very important aids to diagnose infectious, inflammatory, neoplastic and developmental alterations^[2].

As a result of the limitation of the epidemiological studies on children in the oral medicine field, the exact prevalence of oral mucosal lesions in children is not certain^[3].

A study was performed in Italy included 10,128 children at 0-12 years old age, 28.9% of these children were detected with oral mucosal lesions, oral candidiasis was the most common lesions that comprised (28.4%), followed by the traumatic lesions that represented (17.8%) of the cases, while the erythema multiforme

comprised (0.9%) of the cases and represented the least common type, the oral mucosal lesions were more frequent in children with systemic diseases in comparison to healthy children^[4].

Pediatric soft tissue oral lesions classification: Pediatric oral mucosal lesions can occur as sores or ulcers, change in color or size and distortion of the normal anatomy of the oral cavity^[5]. This study focused on oral mucosal lesions and conditions that affect children.

SOFT TISSUES NODULES

Mucocele: The word mucocele is derived from a Latin word that referred to a mucous-filled cavity where mucus refers to mucus while coele refers to a cavity, it is common in the oral cavity, however, it can also appear in other different sites as the appendix, gallbladder, paranasal sinuses and lacrimal sacs^[6].

The main mechanism for oral mucocele development is extravasation of mucus as a result of trauma that ruptures the salivary gland excretory duct, this leads to outpouring of the mucus to the surrounding tissues, histologically this type of mucocele is well encapsulated by the granulation tissue but it is categorized as pseudocyst, since, there is no epithelial lining, the other mechanism is mucous retention in cases of salivary gland duct obstruction^[7].

Clinically, mucocele is asymptomatic, painless swelling but may interfere with chewing and speech, patients may give a history of rapid onset with a change in size, patients might experienced past or recent trauma, especially in the lower lips, or they may have a habit of lip biting, this mucocele considered extravasation type which is more common than the retention type in children^[8].

Pyogenic granuloma: Is a common tumor-like nodule in the mouth, the term pyogenic granuloma is a misnomer since it neither contains pus nor granulomatous^[9].

It generally appears as a painless, soft, sessile or elevated mass with deep red color, the main site is the gingiva followed by the cheek, lips, tongue, palate, mucobuccal fold and frenum^[10].

Oral pyogenic granuloma in one-third of the cases is preceded with trauma, especially at the extra gingival sites, while at the gingiva is mainly caused by the presence of a foreign body or calculus in the gingival crevices^[11].

This lesion course can be described by three phases, the cellular phase, the capillary or vascular phase and the involutionary phase, histopathologically, pyogenic

granuloma can be classified into Lobular Capillary Hemangioma (LCH) and non-lobular capillary hemangioma (non-LCH)^[12].

Irritation fibroma: The fibroma is the most common benign growth in the mouth, it may originate from the gingival connective tissue or the periodontal ligament^[13].

It is considered as hyperplasia rather than neoplasm, it arises as a result of irritation to the mucosal tissues lead to cell proliferation, the irritation can arise from sharp tooth or edge, calculus, overhanging restoration, lip or cheek biting, irregular denture borders or others^[14].

Clinically, fibroma is a sessile or pedunculated mass with colors range from pale to red, the surface can be smooth or ulcerated, its size differs according to its inflammatory reaction components and healing response^[15].

Peripheral Ossifying Fibroma (POF): The peripheral ossifying fibroma, other namings are (fibrous epulis, calcifying fibroblastic granuloma and or peripheral fibroma with calcification) is a localized gingival enlargement that measures less than 1.5 cm at its largest size typically^[16].

It comprises 9% of the gingival growths typically on the interdental papilla mostly at the anterior maxilla with female predilection, it is not certain whether this growth is tumor or reactive proliferative lesion, generally, POF showed benign behavior clinically but there was 16-20% recurrence rate in cases of incomplete excision or persistence of the stimulative factor^[17].

POF can frequently be seen in children and teenagers in response to local trauma as sub-gingival calculus, dental appliances or faulty dental restorations^[18].

Histological examination of this lesion revealed proliferating fibroblasts with interspersed bone or calcified masses, mainly involves the craniofacial bones but it is well demarcated from the surrounding bone, in the central type, the nidus of origin arises in the endosteum or the periodontal ligament adjacent to the root apex causes expansion of the bone medullary cavity associated with the swelling extra orally while in the peripheral type the lesion arises in the tooth-bearing area soft tissues^[19].

Peripheral giant cell granuloma: Is a reactive non-neoplastic lesion that develops in response to local irritant as calculus, food impaction, trauma from tooth extraction, periodontal diseases and surgery, faulty restorations or dentures, generally it arises from

periosteum or cells of periodontal ligaments at any region of the edentulous or toothed areas at the gingiva or the alveolar mucosa^[20].

Peripheral giant cell granuloma appears clinically as a sessile or pedunculate firm mass or bright nodule^[21]. Histological examination is the base to confirm the diagnosis, peripheral giant cell granuloma histology revealed the presence of multinucleated giant cells embedded in a highly fibrous connective tissue stroma with the presence of a high number of fibroblasts of ovoid or spindle shape as well as spicules of osteoid or bone^[22].

ULCERATIVE LESIONS

Are common mucosal lesions in the oral cavity causing clinical complaint, oral ulcers results from denuding of the mucosa from the epithelial cover and exposing of the lamina propria while erosions represented as erythematous patches due to incomplete loss of the epithelial layer^[23].

The most common etiology of oral ulcers are traumatic ulcers, recurrent aphthous ulceration, microbial infection, mucocutaneous diseases, systemic diseases and drug therapy, however, in children, aphthous ulcers or canker sores and herpes-induced stomatitis are the most frequent types seen^[24].

Traumatic ulcer: Are the most common type of oral ulcers, traumatic ulcers may result from physical, chemical and thermal insults, these ulcers can be acute or chronic, the acute type heal within few days results from accidental biting, sharp pieces of food while chronic type may result from chronic trauma from ill-fitting dentures, sharp tooth edge or faulty restorations, also most of these ulcers are unintentional but self-inflicted ulcers can be seen occasionally^[25].

Beside mechanical trauma, traumatic ulcers can result from a thermal or chemical injury that produces acute ulcers, thermal injury seen after burns produced by hot food or drink and during the use of heated dental instruments while the common chemical burns can be seen after the use of aspirin tablet to relieve pain also chemical burns may result unintentionally by the use of therapeutic agents as like eugenol, formocresol, sodium hypochlorite, monomer and others^[26].

Aphthous ulcers: Are common ulcers seen in the oral mucosa represented as shallow and necrotic ulcers with raised erythematous margins found mostly in children between 10-19 years age, 5-25% of the general population are affected frequently, these ulcers are recurrent and caused by many factors like local, genetic and immunopathogenic factors^[27].

Aphthous ulcers may develop in response to activation of immune processes as a result of improper initiation of cytokines cascade, these cytokines are responsible for the induction of cellular and humoral immunity, this disruption in the immune system function in response to not yet defined trigger factors which can be viral and bacterial antigens^[28].

Aphthous ulcers appear in three forms, minor, major and herpetiform, all these forms are painful and may cause dysphagia which results in impairment of quality of life. Although, these lesions heal in several days or weeks after the occurrence but can recur after variable intervals.

The main goal for treatment of recurrent aphthous ulcers is to relieve symptoms and depend on the frequency of recurrence, the severity of the pain and the lesions responsiveness to the management, mainly topical agents are used which include antiseptic or anti-inflammatory agents such as triclosanordiclofenac acid and topical anesthetic agents as lidocaine must be the first used and if these were not advantageous then topical corticosteroid can be used^[29].

Herpes-induced stomatitis: Herpes Simplex Virus (HSV-1) is a double-stranded virus that causes most of the oral infections that transmitted from an infected person to another through the infected body fluids^[30].

The diagnosis is based on the clinical manifestation of erythematous gingiva, mucosal bleeding and small erupted vesicles clustered all through the mouth, in symptomatic children, treatment is focused on pain relief and prevention of dehydration by oral fluids until the infection subsides, however, most of the children will be Asymptomatic^[31].

PIGMENTED LESIONS

White lesions: White lesions are usually asymptomatic and they may present in children as in adults^[32] white lesion include:

Lichen planus: Oral lichen planus is among the commonest oral mucosal disorders in adults while in children it has been infrequently described^[33]. The etiological factor of lichen planus is unknown but neumerous factors have been associated as genetic factor, infection, systemic diseases, drug responses and hypersensitivity to dental constituents and vitamin insufficiencies, six forms of oral lichen planus have been clinically defined "reticular, atrophic, erosive, plaque-like, popular and bullous", the buccal mucosa is the characteristic sites, also it is seen on the dorsum of the tongue and in fewer cases is seen at the gingiva^[34].

In children, in the differential diagnosis of erosive lesions and hyperkeratotic lesions of the oral mucosa, oral lichen planus should be included^[35].

White sponge nevus: White sponge nevus is an asymptomatic disorder with benign behavior, it is caused as a result of an autosomal dominant inheritance, clinically lesions existing as white spongy thickened plaques bilaterally, it is most commonly occurs in the buccal mucosa but may be seen on the labial mucosa, the floor of the mouth and gingival, these lesions rarely develop in the adolescence, but frequently appear in the early childhood or even since the birth^[36].

No treatment is required due to the benign nature of white sponge nevus, precise diagnosis is essential to except other more serious lesions with similar characteristics^[37].

Leukoedema: Is a unilateral or bilateral white lesion seen on the buccal or labial mucosae, its cause is uncertain, but it has been suggested to be caused by local irritation and malocclusion, leukoedema is considered a benign lesion^[4].

Linea alba: Linea alba is a distinct white linear zone seen on the buccal mucosa opposite to the occlusion plane starts from around the commissures of the lips and extends to the molars, it can be seen less frequently at the tongue's lateral border^[5].

Pseudomembranous candidiasis: Pseudomembranous candidiasis "is an opportunistic fungal infection initiated by *Candida albicans*", it is commonly seen in children who currently had an antibiotics use or corticosteroids, or those had been exposed to prolonged use of a pacifier, also in children with certain systemic conditions such as leukemia, those undergoing chemotherapy or radiation therapy or have had an organ transplantation and malnutrition, it is an assurance oral finding^[38].

Oral candidosis can be diagnosed by detection of the clinical signs and symptoms and the existence of the candida hyphae while analyzing a smear directly from the biopsy examination in the epithelium, also a positive microbiological culture with certain serological investigations can confirm the diagnosis^[39].

Treatment can be a topical or systemic application of antifungal medications, topical nystatin for infants and topical nystatin or clotrimazole for older children while systemic fluconazole, ketoconazole or itraconazole can be used for pediatric patients who are at higher risk of evolving systemic infection^[5].

Hairy tongue: Is a condition that effects the tongue because of irregular increase in the length of the filiform papillae (1-12 mm) and/or pigments release from the proliferated bacteria on the tongue surface elongated papillae, also many intrinsic factors are associated with the hairy tongue such as the use of the erythromycin antibiotics, iron supplements or the use of antipsychotics while other factors are applied extrinsically mainly from the diet as coffee and tea^[40].

Red lesions

Petechiae, purpura, ecchymosis: These are red lesions that often caused by damage affecting the underlying blood vessels and also a sign of bleeding disorders such as thrombocytopenia or hemophilia and may be associated with leukemia and anemia in some occasions, the prevalence of vascular lesions in children is 1.89-8.39% and increases to 42.8% in children with systemic diseases, the lesions are mainly seen on the lips, tongue, hard palate and gingiva and are classified as follows:

- Petechiae: pinpoint hemorrhages
- Purpura: 2-mm to 2-cm hemorrhages
- Ecchymosis: >2 cm hemorrhages

Looking for the source of the trauma in the initial investigation is necessary to rule out the child abuse, all other medical conditions or medications-related lesions must be referred for more medical checkup^[4].

Angular cheilitis: This condition refers to the chronic inflammatory process at the skin and the labial mucosa at the corners of the mouth, many etiological factors may induce this condition as nutritional deficiencies mainly (riboflavin, folate), anemia (iron deficiency), allergy, infections, physical irritation, low socioeconomic status and bruxism^[41, 42]. The prevalence is 3% in children and 9% in the adolescent^[42].

Angular cheilitis is described clinically as painful cracking, fissuring and erythema on bilateral commissures, bleeding could be associated, the treatment is related to the cause, for idiopathic causes, the treatment might be as simple as applying petrolatum to the affected areas, in most of the cases, angular cheilitis is infectious that is crucial to be appreciated and should be treated as such^[43].

Erythematous candidiasis: Atrophic or erythematous candidiasis is acute or chronic rare lesions^[44]. Previously called as 'antibiotic sore mouth,' because it is associated with prolonged use of broad-spectrum antibiotics, also

this form is associated with pseudomembranous candidiasis when the white plaque of pseudomembranous candidiasis is scrapped, often red atrophic and painful mucosa remains, furthermore, the erythematous stomatitis and depapillation of tongue arises due to the suppression of the traditional bacterial flora, the symptoms patient often describes includes vague pain or a burning sensation^[45].

Median rhomboid glossitis: Median rhomboid glossitis is an inflammatory lesion seen at the junction between the anterior two thirds and the posterior one third of the tongue anteriorly to the circumvallate papillae, it appears in elevated diamond shape, covered with smooth erythematous mucosa^[46]. It is normally well-circumscribed, a smooth but nodular component is occasionally found or the lesion is often lobulated, the texture may be similar to the subjacent or firm part of the tongue and its surface is relatively soft^[47]. Sometimes, soft palate erythema may be seen where the lesion of median rhomboid glossitis touches the palate, this erythematous area is termed as 'kissing lesion', generally, median rhomboid glossitis is asymptomatic, however, in few cases, pain and ulceration has been reported, in children prevalence has been reported between 0 and 1.23%^[47, 48, 46].

Brown-black lesions

Physiologic pigmentation: This pigmentation is that the commonest sort of diffuse pigmentation that caused by the excessive melanin production in dark-skinned populations (Middle Eastern, African American and infrequently Asians^[49, 50]. Generally, certain factors may associate with the increased prevalence of such lesions in newborns such as race/ethnicity, endocrine syndromes and hormonal changes^[51].

Addison disease: Is an autoimmune disorder leading to insufficient secretion of glucocorticoids and mineralocorticoids, its main symptom is diffuse bronzing of the skin and mucous membranes including the oral mucosa which represented as pigment deposition on the gingivae, tongue and buccal mucosa, besides that the oral surfaces which frequently traumatized could develop the pigmentation frequently, also there is pigment of Physiological origin occur mainly at the buccal mucosa and lips and require no treatment.

Graphite: Graphite pigmentation results from a graphite pencil injury to the oral mucosa which produce pigmentation successively, this kind of lesion commonly occurs in children, it appears as an irregular gray to black

macule within the anterior palate region, malignant lesions like melanoma should be differentiated from these lesions as melanoma too commonly occurs on the palate^[52].

Melanotic nevus: Pigmented nevus is a benign hamartomatous proliferation of the nevus cell either in the epithelium or in the connective tissue, they are classified as congenital or acquired, based on their size the congenital melanocytic nevi are further classified as giant melanocytic congenital nevi (>20 cm) and small melanocytic congenital nevi (<1.5 in diameter), frequently occurs on the skin and is commonly called as a mole, intraorally the hard palate is the common site, microscopically based on the location of the nexus cells, they are classified as junctional, intradermal or intramucosal and compound nevi, the color also varies based on the location of nevus cells, superficial nevi like junctional nevi are darker brown when compared to deeper intramucosal and compound nevi which are light brown while the blue color of the blue nevi can be accounted to the fact that the dermal melanocytes proliferate within the deeper part of the connective tissue, far from the surface epithelium (Tyndall effect)^[52, 53].

CONCLUSION

Oral mucosal lesions in pediatric patients are not uncommon and many types of these lesions can be idiopathic or induced by underlying conditions or diseases, so, a thorough examination and history taking should be carried out and sufficient knowledge of such lesions to reach the correct diagnosis and management.

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