

Review Article

Oral Pathology in Paediatric Patients

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Abstract

The lesions presenting in the oral cavity of neonates are considerably significant in pediatric dentistry. Although they pertain to the oral cavity they may reflect an underlying systemic condition. These may be clinically misdiagnosed or left untreated owing to lack of parental education, awareness and resources. Their management requires thorough knowledge of the various lesions and accurate clinical assessment for diagnosis, prognosis, treatment and parental counseling. Majority lesions are asymptomatic and benign hence resolve without any intervention. This review article is an overview for recognition and management of oral lesions prevalent in neonates.

Keywords: Anatomical pathological conditions; Managed care; Oral pathology

Introduction

Children and adolescents exhibit a wide spectrum of oral lesions including hard and soft tissue lesions of the oral maxillofacial region. The information regarding prevalence of pediatric oral lesions is scanty but US places the prevalence rate in 4-10% excluding infants [1,2]. These lesions include mucosal conditions, developmental anomalies, neoplastic, reactive or inflammatory lesions. Neonates displaying intraoral lesions decree detailed assessment, diagnosis, management and parental counseling in conjunction with a reassurance. This aids timely diagnosis of both usual and rare oral tissue presentation in neonates [1,2].

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Oral Lesions

Epstein pearls

This non-odontogenic cyst results from epithelial remnants entombed along the fusion line of the palatal halves [3,4]. They are smooth, whitish, keratin filled 1-4 mm papules. They resolve in the first 3 months hence treatment is not needed [5,6]. Their incidence is 7.3/1000 live born male newborn babies [7].

Gingival/Dental lamina cyst of neonates

Dental lamina cysts arise from remnants of dental lamina. These asymptomatic, multiple, 1-3 mm, nodular, creamy white lesions present bilaterally on the anterior aspect of dental ridges. Histopathology shows keratin-filled true epithelial cysts. These lesions are present on birth and are self-resolving hence do not require any intervention [8,9]. Prevalence ranges from 25-53% [10].

Bohn's nodules

Bohn's nodules are remnants of minor salivary gland epithelium. These asymptomatic, smooth, whitish keratin filled nodules or papules ranging from 1-3 millimeter arise on the buccal and lingual aspects of the ridge away from the midline. They resolve in the first 3 months of life and have an Incidence of 47.4% [3,6,11,12].

Congenital epulis of the newborn

Granular cell tumor/Neumann's tumor is a rare benign tumor of uncertain histogenesis in the newborn infants. It arises as a protuberant gingival mucosal mass on the anterior maxillary ridge. The etiology is unclear hence the lesion is perhaps hormone related, degenerative or reactive. It is single and firm with a regular surface. It maybe multilobed, sessile or pedunculated, pink or red lesion not tender to palpation. The diameter varies from a few millimeters to over 7 cm [13-16]. Incidence is 0.0006 with a female predilection of 8:1 to 10:1 [17]. Larger lesions may lead to mechanical obstruction in respiration and feeding. Diagnosis is confirmed by site of origin, prenatal/natal Ultrasonography (USG), Computed Tomography (CT)/Magnetic Resonance Imaging (MRI) and histopathology showing scattered odontogenic epithelium, absence of interstitial cells, angulate bodies and vessels. Surgical excision is the treatment of choice [18,19].

Eruption cyst

This soft tissue benign cyst arises around an erupting tooth when the dental follicle separates from the crown of tooth and results in fluid collection within this space [15,20,21]. It is dome shaped and may appear normal to blue-black, purple or brown in color subject to the amount of blood in the cystic fluid after trauma (hematomas). It may also be transparent. Since the tooth erupts through the lesion it resolves. Surgical opening of the roof of the cyst is indicated if it becomes infected or does not rupture [22,23]. The prevalence of eruption cysts of is 22% [24,25].

Epidermoid and dermoid cysts

This slow growing, asymptomatic cyst arises in the floor of the mouth and the submental region these soft, cystic lesions are nodular with a sessile base and lined with squamous epithelium. Clinical diagnosis is via enlargement leading to respiratory distress and feeding difficulties and tests including Magnetic Resonance Imaging (MRI)/Computed Tomography (CT), prenatal/natal Ultrasonography (USG), Fine Needle Aspiration Biopsy (FNAB) and histopathology. An epidermoid cyst is lined by epidermis and a dermoid cyst is lined with adnexa glands. Surgical enucleation is the treatment of choice and recurrence is rare [26,27]. The prevalence in head and neck patients is 7% and in the oral cavity is 1.6% [28].

Mucocele

This is a bluish, well-circumscribed, translucent, fluctuant swelling. It arises on the lower lip lateral to the midline when the excretory duct of a minor salivary gland ruptures due to mechanical trauma and mucin leaks into the surrounding connective tissues with in a fibrous capsule. It may be normal or whitish and keratinized [21]. It may also appear on retromolar region, buccal mucosa, ventral tongue surface and floor of the mouth as a ranula. Superficial mucocele resolves on bursting spontaneously with a shallow ulcer. Treatment minimizes the risk of recurrence [29,30]. The prevalence is 2.4 cases per 1000 people [31].

Riga-Fede disease

The rubbing of natal or neonatal tooth during feeding on the ventral tongue surface, lip, gingival, vestibular mucosa, palate and floor of the mouth leads to ulcers [32,33]. Inability to diagnose and treat this lesion may result in dehydration and inadequate nutritional intake [34]. Treatment should be conservative and focus on creating round, smooth incisal edges. Alternatively extraction is the treatment of choice. Diagnosis is confirmed by clinical examination and histopathology to rule out bacterial, fungal infections, immunologic diseases, and neoplasia as causative factors for ulcers [35,36]. Prevalence of natal-neonatal teeth ranges from 1:6000 to 1:800 [37-40].

Neonatal osteomyelitis of maxilla

A rare infection is attributed to risk factors like catheterization, parenteral nutrition status, prolonged hospitalization, ventilatory support and nosocomial infection or iatrogenic. Causative organisms include *Staphylococcus aureus*, group B Streptococcus (*Streptococcus agalactiae*) and Gram-negative organisms (*Escherichia coli* and *Klebsiella pneumonia*) [40]. The characteristic feature of this condition is gross swelling of the affected side. Maxilla affects both eyelids with proptosis and chemosis; conjunctivitis; swelling and in duration of cheek and includes a unilateral nasal discharge. Chronic osteomyelitis in children is not common. Diagnosis is based on positive blood culture and laboratory tests (erythrocyte sedimentation rate, C-reactive protein, leukocyte count). Antimicrobial drugs with or without surgery are required. The morbidity of this condition is high hence the prognosis is poor. The incidence in 1/1000 to 3/1000 [41-43].

Neonatal candidiasis

Disseminated or invasive candidiasis in preterm newborns is transmitted via external contamination. The candida species include *Candida albicans* (75%), *krusei*, *glabrata*, *tropicalis* and *parapsilosis*.

Risk factors include prolonged hospital stay, immature immune system and prolonged catheterization. It manifests as white plaques of hyphae, epithelial cells and necrotic tissues on the oral mucosa. Systemic features include endophthalmitis, meningitis, urinary tract and cardiovascular infections. Diagnosis is confirmed by blood culture, urine and CSF. Treatment incorporates preventive measures. The incidence of candidemia and/or disseminated candidiasis preterm infants is 7%-20% [44].

Neonatal herpes simplex virus infection

Herpes simplex virus 1 causes orolabial lesions whereas HSV1 and HSV2 cause genital lesions. They are transmitted during parturition and depend on maternal infection (primary or recurrent), maternal antibody, intact mucocutaneous barriers, duration of membrane rupture and delivery [45]. The incubation period ranges from 4-21 days post delivery and the symptoms arise between 6-21 days. The vesicles arise in the mouth, face, scalp, palms and feet. They may be single or clustered; 1-3 mm in diameter and eventually ulcerate. Other symptoms include hepatitis, pneumonitis and seizure and disseminated intravascular coagulation. Diagnosis is based upon viral culture, serology and a polymerase chain reaction amplification analysis of Cerebrospinal Fluid (CSF). Antiviral therapeutic agent is Acyclovir [46]. Incidence is 31 per 100,000 births [47].

Neonatal pemphigus vulgaris

This rare autoimmune, vesiculobullous disease is subsequent to transplacental transmission of maternal immunoglobulin G auto antibodies which counter transmembrane glycoprotein desmoglein three. It manifests as multiple mucosal, cutaneous or mucocutaneous ulcerations after birth. These are intraepithelial blisters and may arise on soft palate, buccal mucosa, ventral surface of the tongue, gingiva and lower lip. In more advanced stages desquamative or erosive gingivitis may be present. The other oral manifestations include sialorrhea, halitosis and brown or blackish crusts at the vermilion border. Symptoms resolve in 2 to 3 weeks and the diagnosis is confirmed by histopathology and immunofluorescence [48]. The incidence is 0.68 cases per 100,000 persons per year but varies in different regions [49].

Hemangioma

This is a benign vascular neoplasm emerging as a macule on birth but may appear a few weeks after and regresses into spotted pigments. The course of disease follows a rapid proliferating phase (0-1 yr), involuting phase (1-5 yr) and involuted phase (5-10 yr). It appears on neck and head, trunk, extremities, lips, tongue, buccal mucosa, palate and uvula [3]. Predisposing factors include infantile age, infant birth weight, childbearing age, gestational hypertension, Kasabach-Merritt syndrome [50]. Diagnosis is made by history, Fine-Needle Aspiration Cytology (FNAC), MRI, and/color doppler USG, histopathology, and immunohistochemistry ruling out other vascular malformations [51]. Stage specific treatment drugs (α -interferon, propranolol, corticosteroids), surgery and lasers (CO₂, flash lamp pulsed dye, diode) are the treatment modalities. Some cases resolve completely but some show permanent skin such as hypopigmentation, telangiectases, anetoderma stippled scarring and fibro-fatty residues [52]. Incidence is 4 to 5% [53].

Melanotic neuroectodermal tumor of infancy

This rare pigmented benign neoplasm appears in the first 6 months

with a male predilection. It arises from the neural crest cells and may be located on the tongue, buccal mucosa, palate or floor of the mouth. It may be present in the craniofacial region, brain, skull, maxilla, mandible and the genitals. It is a painless, expansile, non ulcerative rapidly growing, pigmented, lesion with a locally aggressive behavior. Diagnosis is based on clinical assessment, histopathology and CT/MRI. This biphasic tumor comprises of melanocytic and neuroblast-like round cells. Differential diagnosis includes desmoplastic small round cell tumor, Ewing's sarcoma, neuroblastoma rhabdomyosarcoma, peripheral neuroepithelioma, peripheral primitive neuroectodermal tumor, malignant melanoma and neuroblastoma. Treatment includes chemotherapy and radiotherapy either alone or in combination with surgical excision. Recurrence is high alongside metastasis and malignant transformation rate [54,55]. The overall incidence of local recurrence is 10-15% [56].

Restrictive mandibular lingual frenum/Ankyloglossia

This developmental anomaly is a thick, tight, short fibrous vertical band of tissue called lingual frenum formed by a small band or fold of mucosal membrane. It restricts the movement of tongue (partial ankyloglossia/tongue tie) or fuses the tongue and floor of the mouth (total ankyloglossia). Difficulties associated with neonates include discomfort on breastfeeding, limited mobility of tongue, speech pathology, malocclusion, gingival recession, deglutition problems and localized gingival recession on the lingual aspect of the mandibular incisors. It may be associated with craniofacial anomalies or appear independently. It may be mild, moderate, severe or complete. Treatment may include surgical correction via frenuloplasty [57,58]. The incidence varies from 0.1% to 4.8% [59].

Mandibular labial frenum

A high frenum present in the shallow vestibular region of the mandibular permanent central incisor inserts into the free or marginal gingival tissue [60]. Lower lip movements pull the fibers and lead to food and plaque entrapment [61]. Inflammation, pocket formation, recession, alveolar bone loss and/or tooth can be prevented by early treatment. It is corrected by a surgical incision via frenuloplasty/frenotomy thereby releasing the frenum and correcting anatomy or frenectomy via cutting frenum, hemostasis and wound management [62]. Post procedure care includes soft diet, oral hygiene instructions and analgesic. Other techniques such as electro surgery or lasers have a short working time, better hemostasis, few postoperative complications (swelling, infection), reduced intra-and post-operative pain, better patient acceptance and no suture removal. Laceration of frenum may lead to profuse bleeding the prevalence of interdental space in the primary dentition is 70% for the maxilla and 63% for mandible [63].

Natal and neonatal teeth

Natal teeth are present at birth and neonatal teeth erupt during the first 30 days of life. The incidence varies from 1:1,000 to 1:30,000 [62]. It affects the mandibular primary incisors [62]. Molars may be associated with systemic conditions or syndromes such as histiocytosis X, Pfeiffer syndrome [61,62]. Etiology maybe a superficial tooth germ associated with a hereditary factor [61]. If excessive tooth mobility or feeding problems are absent then the tooth should be preserved. Riga-Fede disease is an ulceration caused by rubbing of the natal or neonatal tooth against the ventral tongue surface during

feeding. Failure to diagnose and treat this lesion may lead to dehydration and inadequate nutritional intake for the infant. If the treatment is conservative then the incisal edge is smoothed. The alternate option is extraction. Potential for haemorrhage is important to consider prior to extracting a natal or neonatal tooth and for a child less than 10 days of age a pediatrician should be consulted regarding adequate hemostasis [61,62].

Odontogenic infections

These are typically polymicrobial and comprise of aerobic, facultative anaerobes and strict anaerobes. Intraoral infections and abscesses develop via basic inflammatory processes, relevant pathogens, biochemical processes mediated by pro-inflammatory molecules, host response and manifest clinically as intraoral septic processes. They are secondary to caries, trauma or periodontal problems and may involve more than one tooth.

Soft tissue infections of odontogenic origin spread along planes of least resistance from the supporting structures of the affected tooth to various potential spaces in the vicinity. Accumulated pus must perforate bone, generally at the site where it is thinnest and weakest, before extending into the periapical areas or deeper facial spaces. If the pus perforates through either the maxillary or mandibular buccal plate inside the attachment of the buccinator muscle, infection is intraoral. If the perforation is outside this muscle attachment, infection will be extraoral [64].

If these infections are left untreated they may lead to abscess, pain, cellulitis and discomfort on eating or drinking and dehydration. Infection in the upper part of the face includes facial pain, fever, and inability to eat or drink and difficult to localize. Sinusitis may mimic the symptoms of an odontogenic infection hence should be ruled out. Infections in the lower part of the face include pain, swelling, and trismus [26]. They may be associated with the skin, teeth, lymph nodes, and salivary glands [26] and a swelling of the lower face is most likely associated with a dental infection [64].

Management of odontogenic infections includes pulp therapy, incision and drainage or an extraction [65]. Antibiotics are indicated in systemic manifestations such as facial cellulitis, difficulty in swallowing or breathing, fatigue, high temperature (102 to 104 degrees Fahrenheit) and nausea. Rare but severe odontogenic infection complications such as Ludwig's angina and cavernous sinus thrombosis [26,65] may be life threatening and may require instant hospitalization, intravenous antibiotics, incision and drainage and referral/consultation for an oral and maxillofacial surgeon [26,65] (Table 1).

Pediatric Oral Pathology Management

Diagnosis for paediatric oral lesions is based on a thorough history, assessment of risk factors, detailing the signs and symptoms of the lesion. The lesion most likely to be the working diagnosis is determinant of the initial management. A definitive diagnosis is made after a biopsy of the unhealthy tissue. Biopsy is the gold standard for diagnostic tests. It is the exclusion of a portion of live tissue for diagnostic study [19]. Excisional biopsies are the total removal of small sized lesions smaller than one centimeter. An incisional biopsy is performed on a suspected malignancy in which a lesion maybe large, diffuse or multifocal. Multiple incisional biopsies may be indicated for lesions which are diffuse. Diagnosis maybe assisted by adjunctive tests such as a fine needle aspiration, exfoliative cytology and the cytobrush technique [66,67].

Condition	Incidence	Prevalence	Differential diagnosis
Epstein Pearls	7.3/1000		They are smooth, whitish and keratin filled 1-4 mm papules. They are present along the fusion line of the palatal halves. Differential diagnosis: Bohn nodules.
Gingival/Dental Lamina Cyst of Neonates	7.3/1000		Asymptomatic, multiple, 1-3 mm, nodular, creamy white lesions present bilaterally on the anterior aspect of dental ridges. Differential diagnosis: Hemangioma, melanoma, unicystic ameloblastoma, keratinizing cystic odontogenic tumor and mucocele.
Bohn's Nodules	47.4%		Asymptomatic, smooth, firm, whitish keratin filled nodules or papules ranging from 1-3 millimeter arise on the buccal and lingual aspects of the maxillary ridge away from the midline. Differential diagnosis: Epstein pearl (Dental lamina cyst) and natal teeth.
Congenital Epulis of the Newborn	0.0006		A protuberant tumor mass of gingival mucosa on the anterior maxillary ridge. It is single, firm with a regular surface. It maybe multilobed, sessile or pedunculated, pink or red mass and not painful on palpation. Differential diagnosis: Granular cell tumor.
Eruption Cyst		22%	Soft tissue benign cyst arising around an erupting tooth when the dental follicle separates from the crown of tooth and results in fluid collection within this space. It is a dome shaped swelling and the color ranges from normal to blue-black, purple or brown. It may be transparent as well. Differential diagnosis: Granuloma, amalgam tattoo and Bohns nodule, dentigerous cyst.
Epidermoid and Dermoid Cysts		1.6%	Epidermoid cyst is lined by epidermis. A dermoid cyst is lined with adnexa glands. These soft, cystic lesions are nodular with a sessile base and lined with squamous epithelium. Differential diagnosis: Ranula, lymphatic malformation and heterotypic gastrointestinal cyst, granular cells, schwannoma, lipoma and neurofibroma.
Mucocele		2.4 per 1000	This is a bluish, well-circumscribed, translucent, fluctuant swelling. It arises on the lower lip lateral to the midline when the excretory duct of a minor salivary gland ruptures due to mechanical trauma and mucin leaks into the surrounding connective tissues with in a fibrous capsule. Differential diagnosis: Mucous retention cyst, benign or malignant salivary gland neoplasms, hemangioma, lymphangioma, venous varix or venous lake, lipoma, soft irritation fibroma, oral lymphoepithelial cyst, gingival cyst in adults, soft tissue abscess, cysticercosis (parasitic infection), anterior lingual mucoceles (Blandin-Nuhn mucoceles) may resemble hemangioma, Pyogenic granuloma, fibroepithelial polyp.
Riga-Fede Disease		1:6000 to 1:800	The rubbing of natal or neonatal tooth during feeding on the ventral tongue surface, lip, gingiva, vestibular mucosa, palate and floor of the mouth leads to ulcers. Differential diagnosis: Fungal infection, tuberculosis, cytomegalovirus. Neoplasms like lymphoma, leukemia, sarcoma and granular cell myoblastoma. Others include recurrent aphthae, bechets disease, pernicious anemia, chemical burns and granulocytosis.
Neonatal Osteomyelitis of Maxilla	1/1000-3/1000		The characteristic feature of this condition is gross swelling of the affected side. Acute fever follows redness and edema of cheek, swollen eyelids with conjunctivitis and unilateral nasal discharge attributed to risk factors like catheterization, parenteral nutrition status, prolonged hospitalization, ventilatory support and nosocomial infection or iatrogenic. Differential diagnosis: Ewing's sarcoma, langerhans cell histiocytosis, bone metastases, and chronic recurrent multifocal osteomyelitis.
Neonatal Candidiasis	7-20%		It manifests as white plaques of hyphae, epithelial cells and necrotic tissues on the oral mucosa. Differential diagnosis: Chemical burn, reactive keratosis, hairy leukoplakia, plaque type lichen planus, erosive lichen planus, premalignant leukoplakia, thermal burns, migratory glossitis.
Neonatal Herpes Simplex Virus Infection	31/1000		The vesicles arise in the mouth, face, scalp, palms and feet. They may be single or clustered; 1-3 mm in diameter and eventually ulcerate. Other symptoms include hepatitis, pneumonitis and seizure and disseminated intravascular coagulation. Differential diagnosis: Neonatal sepsis, pediatric chickenpox, pediatric cytomegalovirus infection, pediatric enteroviral infections, pediatric erythema toxicum, pediatric sepsis, zoster workup.
Neonatal Pemphigus Vulgaris	0.68/100,000		An autoimmune, vesiculobullous disease manifests as multiple mucosal, cutaneous or mucocutaneous ulcerations after birth. The intraepithelial blisters may arise on soft palate, buccal mucosa, vernta surface of the tongue, gingiva and lower lip. In more advanced stages desquamative or erosive gingivitis may be present. The other oral manifestations include sialorrhea, halitosis and brown or blackish crusts at the vermillion border. Differential diagnosis: Recurrent aphthous stomatitis, behçet disease, erythema multiforme, erosive lichen planus, and oral candidiasis, disseminated erythematous lupus, enteropathic acrodermatitis, crohn's disease, hemorrhagic rectal colitis; and deficiencies in folic acid, vitamin B12, or hypochromic iron.
Hemangioma	4-5%		This is a benign vascular neoplasm emerging as a macule on birth but may appear a few weeks after and regresses into spotted pigments. The course of disease follows a rapid proliferating phase (0-1 yr), involuting phase (1-5 yr) and involuted phase (5-10 yr). It appears on neck and head, trunk, extremities, lips, tongue, buccal mucosa, palate and uvula. Differential diagnosis: Angiosarcoma, Capillary malformation, cherry hemangioma, cobb syndrome, congenital hemangioma (noninvoluting and rapidly involuting), dabska tumor, dermatofibrosarcoma protuberans, cutaneous lipomas, pyogenic granuloma (lobular capillary hemangioma), diffuse neonatal heman-giomatosis, gorham syndrome, infantile fibrosarcoma, infantile myofibromatosis, kaposiform heman-gioendo-thelioma, lipoblastoma of infancy, lymphatic malformation, oral lymphangiomas, pediatric rhabdomyosarcoma, pediatric teratomas and other germ cell tumors, riley-smith syndrome, venous malformations.
Melanotic Neuroectodermal Tumor of Infancy	10-15%		This rare pigmented benign neoplasm appears in the first 6 months arises from the neural crest cells and may be located on the tongue, buccal mucosa, palate or floor of the mouth, or maybe in the craniofacial region, brain, skull, maxilla, mandible and the genitals. It is a painless, expansile, nonulcerative rapidly growing, pigmented, lesion with a locally aggressive behavior. Differential diagnosis: Periapical cyst, dentigerous cyst, odontogenic keratocyst, calcifying odontogenic cyst.
Restrictive Mandibular Lingual Frenum/Ankyloglossia	0.1% to 4.8%		A short, thick and tight fibrous vertical band of tissue formed by small band or fold of mucosal membrane may limit tongue movement (partial ankyloglossia/tongue tie) or fuse the tongue to the floor of the mouth (total ankyloglossia). Differential diagnosis: Complete ankyloglossia, bifid tongue, microglossia

Mandibular Labial Frenum		63%	A high frenum present in the shallow vestibular region of the mandibular permanent central incisor region inserts into the free or marginal gingival tissue. Lower lip movements pull the fibers and lead to food and plaque entrapment, inflammation, pocket formation, recession and alveolar bone loss. Differential diagnosis: Traumatic scar, frenal tag.
Natal and Neonatal Teeth	1:1,000 to 1:30,000		Natal teeth are present at birth and neonatal teeth erupt during the first 30 days of life. Riga-Fede disease is an ulceration caused by rubbing of the natal or neonatal tooth against the ventral tongue surface during feeding. Differential diagnosis: Carious lesion, pulp polyp or premature eruption of successor teeth.
Odontogenic Infections	10-40%		They are secondary to caries, trauma or periodontal problems and may involve more than one tooth. If these infections are left untreated they may lead to abscess, pain, cellulitis and discomfort on eating or drinking and dehydration. Infection in the upper part of the face includes facial pain, fever, and inability to eat or drink and difficult to localize. Differential diagnosis.

Table 1: Outlining paediatric oral lesions.

The biopsy specimen from the oral and maxillofacial region is submitted for histopathology. Tissues excluded include carious teeth without soft tissue attachment, extirpated pulp and normal tissue from gingival recontouring [68]. Gross description of the tissue removed should be entered into the patient record. A lesion which persists for more than two weeks despite removing the causative agent or drug therapy warrants a soft tissue biopsy. If the differential diagnosis indicates more than one disease or neoplasm the hard or soft tissue must be evaluated by a pathologist. Histopathology informs about the clinical behavior, a definitive diagnosis, prognosis, the need for additional treatment or follow-up, allows evidence-based care provision with an increased likelihood for a positive result [68]. Oral biopsies can be performed by a pediatric dentist however. The lesions which should have a biopsy include gingival hyperplasia unresponsive to oral hygiene regimen, mucocoele, pyogenic granuloma and other reactive lesions of gingiva, squamous papilloma or oral wart, irritation fibroma, periapical cyst or granuloma which may or may not be attached to an extracted tooth, inflamed operculum, hyperkeratosis of uncertain cause, benign migratory glossitis with an atypical or stationary pattern, smokeless tobacco keratosis, persistent oral ulcers, mucocutaneous diseases, odontoma and dentigerous or dental follicle cyst [69,70].

Conclusion

Hence management of oral pathology in neonates should encompass a thorough knowledge of various oral lesions and the ability to clinical and radiographic examination inclusive of any added investigation for precise diagnosis, prognosis, treatment outcomes and parental counseling.

References

- Kleinman DV, Swango PA, Pindborg JJ (1994) Epidemiology of oral mucosal lesions in United States schoolchildren: 1986-87. *Community Dent Oral Epidemiol* 22: 243-253.
- Shulman JD (2005) Prevalence of oral mucosal lesions in children and youths in the USA. *Int J Paediatr Dent* 15: 89-97.
- Neville BW, Damm DD, White DK (2003) Pathology of the teeth. In: *Color atlas of clinical oral pathology*, (2nd edn). Williams & Wilkins, Baltimore, USA, Pg no: 58-60.
- Howard RD (1967) The unerupted incisor. A study of the postoperative eruptive history of incisors delayed in their eruption by supernumerary teeth. *Dent Pract Dent Rec* 17: 332-341.
- Flaitz CM (2013) Differential diagnosis of oral lesions and developmental anomalies. In: Casamassimo PS, Fields HW, McTigue DJ, Nowak A (eds.). *Pediatric dentistry: Infancy through adolescence*, (5th edn). Elsevier Saunders, St. Louis, USA.
- Hayes PA (2000) Hamartomas, eruption cyst, natal tooth and epstein pearls in a newborn. *ASDC J Dent Child* 67: 365-368.
- Faridi MM, Adhami S (1989) Prepuccial epstein pearls. *Indian J Pediatr* 56: 653-655.
- Regezi JA, Sciubba JJ, Jordan RCK (2012) Cysts of the jaws and neck. In: *Oral pathology: clinical-pathologic correlations*, (6th edn). Elsevier Saunders, St. Louis, USA, Pg no: 245-256.
- Rajendra R, Sivapathasundharam B (2009) Shafer's textbook of oral pathology. (6th edn), Elsevier, New Delhi, India.
- Kumar A, Grewal H, Verma M (2008) Dental lamina cyst of newborn: A case report. *J Indian Soc Pedod Prev Dent* 26: 175-176.
- Chi AC, Damm DD, Neville BW, Allen CM, Bouquot J, (2009) Developmental defects of the oral and maxillofacial region. In: *Oral and maxillofacial pathology*, (3rd edn). Elsevier Saunders, St. Louis, USA, Pg no: 25-27.
- George D, Bhat SS, Hegde SK (2008) Oral findings in newborn children in and around Mangalore, Karnataka State, India. *Med Princ Pract* 17: 385-389.
- Aldred MJ, Cameron AC (2008) Pediatric oral medicine and pathology. In: Nowak A, Casamassimo P (eds.). *Handbook of Pediatric Dentistry*, (3rd edn). Elsevier Saunders, Philadelphia, USA. Pg no: 192-216.
- Chi CA, Damm DD, Neville BW, Allen CM, Bouquot JE (2009) Soft tissue tumors. In: *Oral and Maxillofacial Pathology*, (3rd edn). Elsevier Saunders, St. Louis, USA, Pg no: 537-538.
- Lapid O, Shaco-Levy R, Krieger Y, Kachko L, Sagi A (2001) Congenital epulis. *Pediatrics* 107: 22.
- Marakoglu I, Gursoy UK, Marakoglu K (2002) Congenital epulis: Report of a case. *ASDC J Dent Child* 69: 191-192.
- Bosanquet D, Roblin G (2009) Congenital epulis: A case report and estimation of incidence. *Int J Otolaryngol* 2009: 508780.
- Shear M, Speight P (2007) Cysts of the oral and maxillofacial regions, (4th edn). Oxford: Blackwell Munksgaard, Copenhagen, Denmark.
- Alemán Navas RM, Martínez Mendoza MG, Leonardo MR, Silva RA, Herrera HW, et al. (2010) Congenital eruption cyst: A case report. *Braz Dent J* 21: 259-262.
- Melrose RJ, Handlers JP, Kerpel S, Summerlin DJ, Tomich CJ (2007) The use of biopsy in dental practice. The position of the American Academy of Oral and Maxillofacial Pathology. *Gen Dent* 55: 457-461.

21. Lee JM, Kim UK, Shin SH (2013) Multiple congenital epulis of the newborn: A case report and literature review. *J Ped Surg Case Rep* 1: 32-33.
22. McGuire TP, Gomes PP, Freilich MM, Sándor GK (2006) Congenital epulis: A surprise in the neonate. *J Can Dent Assoc* 72: 747-750.
23. Sonis A, Keels MA (2007) Oral pathology/oral medicine/syndromes. In: Nowak AJ, Casamassimo PS (eds.). *The Handbook: Pediatric Dentistry*, (3rd edn). American Academy of Pediatric Dentistry, Chicago, USA. Pg no: 29-53.
24. Bodner L (2002) Cystic lesions of the jaws in children. *Int J Pediatr Otorhinolaryngol* 62: 25-29.
25. Mallya SM, Lurie AG (2014) Panoramic imaging. In: White S, Pharoah M (eds.). *Oral radiology: Principles and interpretation*, (7th edn). Elsevier Saunders, St. Louis, USA. Pg no: 166-184.
26. Kaban LB, Troulis MJ (2004) Infections of the maxillofacial region. In: Dodson TB, Kaban LB (eds.). *Pediatric Oral and Maxillofacial Surgery*. Elsevier Saunders, Philadelphia, USA, Pg no: 171-186.
27. American Academy of Pediatric Dentistry (2015) Guideline on management of the developing dentition and occlusion in pediatric dentistry. *Pediatr Dent* 37: 253-265.
28. Mirza S, Fadl S, Napaki S, Abualruz A (2014) Case report of complicated epidermoid cyst of the floor of the mouth: Radiology-histopathology correlation. *Qatar Med J* 2014: 12-16.
29. Kara C (2008) Evaluation of patient perceptions of frenectomy: A comparison of Nd: YAG laser and conventional techniques. *Photomed Laser Surg* 26: 147-152.
30. Suga K, Muramatsu K, Uchiyama T, Takano N, Shibahara T (2010) Congenital epidermoid cyst arising in soft palate near uvula: A case report. *Bull Tokyo Dent Coll* 51: 207-211.
31. Humperly PA, Dehner LP, Feifer JP (2004) Salivary Gland Pathology. Section I, Head Neck. *The Washington manual of surgical pathology*. Lippincott Williams and Wilkins, Philadelphia, USA. Pg no: 70-72.
32. Baumrath HD (2003) Mucocoeles and ranulas. *J Oral Maxillofac Surg* 61: 369-378.
33. Russell KA, Folwarczna MA (2003) Mesiodens--diagnosis and management. *J Can Dent Assoc* 69: 362-366.
34. Park SW, Lee JJ, Chae SA, Yoo BH, Kim GJ, et al. (2013) Congenital epidermoid cyst of the oral cavity: Prenatal diagnosis by sonography. *Clin Exp Otorhinolaryngol* 6: 191-193.
35. Slayton RL (2000) Treatment alternatives for sublingual traumatic ulceration (Riga-Fede disease). *Pediatr Dent* 22: 413-414.
36. Leung AK, Robson WL (2006) Natal teeth: A review. *J Natl Med Assoc* 98: 226-228.
37. Joseph BK, BairavaSundaram D (2010) Oral traumatic granuloma: Report of a case and review of literature. *Dent Traumatol* 26: 94-97.
38. Costacurta M, Maturo P, Docimo R (2012) Riga-Fede disease and neonatal teeth. *Oral Implantol (Rome)* 5: 26-30.
39. van der Meij EH, de Vries TW, Eggink HF, de Visscher JG (2012) Traumatic lingual ulceration in a newborn: Riga-Fede disease. *Ital J Pediatr* 38: 20.
40. Rao RS, Mathad SV (2009) Natal teeth: Case report and review of literature. *J Oral Maxillofac Pathol* 13: 41-46.
41. Korakaki E, Aligizakis A, Manoura A, Hatzidaki E, Saitakis E, et al. (2007) Methicillin-resistant *Staphylococcus aureus* osteomyelitis and septic arthritis in neonates: Diagnosis and management. *Jpn J Infect Dis* 60: 129-131.
42. Polin R, Spitzer A (2014) *Fetal and neonatal secrets*, (3rd edn). Elsevier Saunders, Philadelphia, USA.
43. Dunphy DL, Frazer JP (1947) Acute osteomyelitis of the maxilla in a newborn: Report of a case successfully treated with penicillin and sulfadiazine. *Yale J Biol Med* 19: 877-881.
44. Benjamin DK, Stoll BJ, Fanaroff AA, McDonald SA, Oh W, et al. (2006) Neonatal candidiasis among extremely low birth weight infants: Risk factors, mortality rates, and neurodevelopmental outcomes at 18 to 22 months. *Pediatrics* 117: 84-92.
45. Kitterman JA, Hamrick SEG, Keller RL (2003) *Candidiasis, Section III, Intensive care nursery house staff manual*. University of California San Francisco, San Francisco, USA. Pg no: 128-129.
46. Tinoco-Araujo JE, Araújo DF, Barbosa PG, Santos PS, Medeiros AM (2013) Invasive candidiasis and oral manifestations in premature newborns. *Einstein (Sao Paulo)* 11: 71-75.
47. Brown ZA, Wald A, Morrow RA, Selke S, Zeh J, et al. (2003) Effect of serologic status and cesarean delivery on transmission rates of herpes simplex virus from mother to infant. *JAMA* 289: 203-209.
48. Kimberlin DW (2004) Neonatal herpes simplex infection. *Clin Microbiol Rev* 17: 1-13.
49. Bialynicki-Birula R, Dmochowski M, Maj J, Gornowicz-Porowska J (2011) Pregnancy-triggered maternal pemphigus vulgaris with persistent gingival lesions. *Acta Dermatovenerol Croat* 19: 170-175.
50. Parker LA, Montrowl SJ (2004) Neonatal herpes infection: A review. *NAINR* 4.
51. Amer YB, Al Ajroush W (2007) Pemphigus vulgaris in a neonate. *Ann Saudi Med* 27: 453-455.
52. Barnes L (2001) *Surgical pathology of the head and neck*, (2nd edn). Marcel Dekker, New York, USA.
53. Kilcline C, Frieden IJ (2008) Infantile hemangiomas: How common are they? A systematic review of the medical literature. *Pediatr Dermatol* 25: 168-173.
54. North PE (2010) *Pediatric Vascular Tumors and Malformations*. *Surg Pathol Clin* 3: 455-494.
55. Zheng JW, Zhang L, Zhou Q, Mai HM, Wang YA, et al. (2013) A practical guide to treatment of infantile hemangiomas of the head and neck. *Int J Clin Exp Med* 6: 851-860.
56. Chaudhary A, Wakhlu A, Mittal N, Misra S, Mehrotra D, et al. (2009) Melanotic neuroectodermal tumor of infancy: 2 decades of clinical experience with 18 patients. *J Oral Maxillofac Surg* 67: 47-51.
57. Kruse-Lösler B, Gaertner C, Bürger H, Seper L, Joos U, et al. (2006) Melanotic neuroectodermal tumor of infancy: Systematic review of the literature and presentation of a case. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 102: 204-216.
58. Segal LM, Stephenson R, Dawes M, Feldman P (2007) Prevalence, diagnosis, and treatment of ankyloglossia: Methodologic review. *Can Fam Physician* 53: 1027-1033.
59. Kupietzky A, Botzer E (2005) Ankyloglossia in the infant and young child: Clinical suggestions for diagnosis and management. *Pediatr Dent* 27: 40-46.
60. Ochi JW (2014) Treating tongue-tie: Assessing the relationship between frenotomy and breastfeeding symptoms. *Clin Lactation* 5: 20-27.
61. Dollberg S, Botzer E, Grunis E, Mimouni FB (2006) Immediate nipple pain relief after frenotomy in breast-fed infants with ankyloglossia: A randomized, prospective study. *J Pediatr Surg* 41: 1598-1600.

62. Webb AN, Hao W, Hong P (2013) The effect of tongue-tie division on breastfeeding and speech articulation: a systematic review. *Int J Pediatr Otorhinolaryngol* 77: 635-646.
63. Kaban LB, Troulis MJ (2004) Intraoral soft tissue abnormalities. In: Kaban LB, Troulis MJ (eds.). *Pediatric Oral and Maxillofacial Surgery*. Elsevier Saunders, Philadelphia, USA, Pg no: 147-153.
64. Seow WK (2003) Diagnosis and management of unusual dental abscesses in children. *Aust Dent J* 48: 156-168.
65. Wilson S, Montgomery RD (2013) Local anesthesia and oral surgery in children. In: Casamassimo PS, Fields HW Jr, McTigue DJ, Nowak A, (eds.). *Pediatric Dentistry: Infancy through Adolescence*, (5th edn). Elsevier Saunders, St Louis, USA. Pg no: 398-410.
66. Rethman MP, Carpenter W, Cohen EE, Epstein J, Evans CA, et al. (2010) Evidence-based clinical recommendations regarding screening for oral squamous cell carcinomas. *J Am Dent Assoc* 141: 509-520.
67. Kazanowska K, Halon A, Radwan-Oczko M (2014) The role and application of exfoliative cytology in the diagnosis of oral mucosa pathology - Contemporary knowledge with review of the literature. *Adv Clin Exp Med* 23: 299-305.
68. American Academy of Oral and Maxillofacial Pathology (2015) Submission policy on excised tissue. American Academy of Oral and Maxillofacial Pathology, Illinois, USA.
69. McDonald R, Avery D, Dean J (2011) Examination of the mouth and other relevant structures. In: Dean J, Avery D, McDonald R (eds.). *McDonald and Avery's Dentistry for the Child and Adolescent* (9th edn). Elsevier Saunders, Maryland Heights, USA. Pg no: 3.
70. AAPD Reference Manual (2015). Guideline on management considerations for pediatric oral surgery and oral pathology. AAPD Reference Manual, Pg no: 16.