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## **Inclusion cysts, natal and neonatal teeth, congenital epulis and hemangioma: An update**

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### **Abstract**

**Introduction:** In newborns, some benign transient conditions of the oral mucosa are often observed.  
**Objective:** To evaluate the literature on the most common alterations found in the oral cavity of newborns such as inclusion cysts, natal and neonatal teeth, congenital epulis and hemangioma.

**Methodology:** Electronic bibliographic databases (PubMed, EBSCO, Cochrane) were used using the keywords "inclusion cyst", "natal and neonatal tooth", "congenital épulis", "hemangioma".

**Results:** The most common alterations are inclusion cysts divided into Epstein pearls, Bohn's nodules and dental lamina cysts, which present as white, multiple nodules of the maxillary and mandibular alveolar ridges and the region of the mid-palate, they do not receive treatment since they are usually transient. Natal teeth present in the mouth at birth and neonatal teeth before 30 days of life, with unknown etiology, the treatment is to polish sharp edges to avoid Riga-Fede ulcer, congenital epulis is a mass that arises from the gum and is composed of polygonal cells. Hemangioma is the most common vascular tumor of white tissues, reddish to pinkish color, rapid growth, clinical diagnosis and MRI or CT scan, transient or surgical excision can be performed for complications.

**Conclusions:** These alterations are benign. Our job as pediatric dentists is to reassure parents about the uneasiness they may cause, a correct diagnosis will be the key to provide adequate care.

**Keywords:** "Inclusión cyst", "natal and neonatal tooth", "congenital épulis", "hemangioma"

### **1. Introduction**

In newborns, some benign transient oral mucosal conditions are often observed. These lesions exhibit a wide range of developmental abnormalities and morphologic variations. Identification and differentiation of lesions remains crucial in guiding clinicians in prioritizing the management of these problems, as well as in educating parents [1].

According to the American Academy of Pediatric Dentistry (AAPD), numerous soft and hard tissue lesions, masses, or tumorous conditions pertaining to the oral and maxillofacial regions of children and adolescents have been described; most of these lesions are mucosal conditions [2]. Knowledge of oral pathology in the newborn is essential for the clinician working with infants. Proper diagnosis, treatment and follow-up are necessary [3].

Abnormalities in the oral cavity of infants are not uncommon, but most are harmless and resolve with age in the absence of treatment [4]. Knowledge of oral pathology in the newborn is important for recognition, diagnosis and appropriate management by both the pediatrician and the pediatric stomatologist [3].

Among the congenital and developmental oral alterations, we can find inclusion cysts, which are comprised of Bohn's nodules, Epstein's pearls and dental lamina cysts; natal and neonatal teeth; congenital epulis of the newborn; ankyloglossia; Riga-Fede ulcer; eruption cysts; eruption hematoma; among others. Most of these are transient and characteristic of the infant's mouth [5]. A prevalence of 89-94% has been reported and it is estimated that at least 50% of Mexican newborns present gingival cysts, being infrequent after three months of life [6].

Oral alterations in newborns or infants can cause anxiety in parents, since they do not know if the lesion presented is malignant or benign, in this study we conducted this literature search

about the most common alterations found in the oral cavity of newborns, such as inclusion cysts, neonatal and neonatal teeth, congenital epulis and hemangioma.

## 2. Materials and Methods

Articles on the subject published through the PubMed, SCOPUS and Google Scholar databases were analyzed, with emphasis on the last 5 years. The quality of the articles was evaluated using PRISMA guidelines, i.e., identification, review, choice and inclusion. The quality of the reviews was assessed using the measurement tool for evaluating systematic reviews (AMSTAR-2). The search was performed using Boolean logical operators AND, OR and NOT. It was realized with the words "inclusion cyst", "natal and neonatal tooth", "congenital epulis", "hemangioma"<sup>[7]</sup>. The keywords were used individually, as well as each of them related to each other.

## 3. Results & Discussion

### 3.1 Inclusion Cysts (Bohn's Nodules And Epstein Pearls, Dental Lamina Cysts)

Oral inclusion cysts can be diagnosed at birth or within a few hours/days of newborn life, remaining in the oral cavity for approximately 6 months, when the first teeth erupt<sup>[8]</sup>. They are described as white, raised, multiple nodules of the maxillary and mandibular alveolar ridges and midpalatal region. Fromm classified oral inclusion cysts according to their location as Epstein's pearls, Bohn's nodules and dental lamina cysts<sup>[4]</sup>.

**Epstein's pearls:** In 1880, the Prague pediatrician Alois Epstein first described Epstein's disease as the presence of small nodules in the oral cavity of newborns.

- **Etiology:** Epstein's pearls have been labeled as epithelial remnants of the dental follicle, gingival glands of Serres and abortive enamel organs in the palatal area<sup>[8, 4]</sup>.
- **Prevalence:** Epstein pearls are seen in almost 60% to 85% of newborns. Among different racial groups, Japanese newborns are the most affected (up to 92%), followed by Caucasians and African Americans<sup>[9, 10]</sup>.
- **Diagnosis:** Epstein's pearls are small keratin-filled cystic nodules, often seen on the roof of the palate, caused by trapped epithelium during palatal development<sup>[11, 10]</sup>.
- **Bohn's nodules:** Heinrich Bohn described Bohn's nodules as "cysts of the mucous glands".
- **Etiology:** Bohn's nodules have been described as debris derived from mucous gland tissues. On the other hand, Bohn's nodules are those found along the vestibular and lingual sides of the dental ridges<sup>[9, 12]</sup>.
- **Prevalence:** The results vary depending on the locality, there are results that there can be up to 40% prevalence<sup>[5, 13]</sup>.
- **Diagnosis:** Small whitish lesions can frequently be seen on the alveolar ridge on the vestibular, palatal and lingual sides<sup>[3, 4]</sup>.
- **Dental lamina cysts:** The dental lamina cyst is also known as the gingival cyst of newborns.
- **Etiology:** These are raised nodules on the alveolar ridges of infants, derived from the remnants of the dental lamina consisting of a keratin-producing epithelial lining. These cystic lesions can be easily detected by their characteristic clinical appearance in the oral cavity of infants, so histopathological confirmation is not necessary<sup>[4, 14]</sup>.
- **Prevalence:** The reported prevalence of palatal cysts in newborns is about 65%, while for alveolar cysts it varies

from 25% to 53%<sup>[14, 15]</sup>.

- **Diagnosis:** These cysts appear as small, isolated or multiple, whitish papules. These cysts can be classified as palatal (located in the midline of the raphe)<sup>[15, 16]</sup>.

**Treatment:** These cysts both as Bohn's nodules as well as Epstein's pearls and dental lamina cysts rupture and disappear between 2 weeks and 5 months without any treatment, their transient nature is believed<sup>[8, 16]</sup>.

Inclusion cysts are among the most common benign lesions in the oral cavity of pediatric patients, three different types are found, Epstein's pearls which are remnants of epithelial tissue, they are found in up to 85% of newborns and are found in the roof of the palate, There are also Bohn's nodules which are remnants of mucous gland tissues, with a 40% prevalence and these are observed in the alveolar border, dental lamina cysts are derived from the dental lamina, their prevalence varies from 25-53%, these are found in the median raphe. No treatment is performed for any inclusion cysts because they are usually transient.

### 3.2 Natal And Neonatal Teeth

**Etiology:** Natal and neonatal teeth are rare dental anomalies seen in the oral cavity of a newborn infant. These teeth are the result of a biological alteration in tooth chronology, the etiology of which is not yet understood<sup>[17]</sup>. The etiology remains unknown but the most widely accepted is the superficial position of the tooth germ above the alveolar bone, possibly related to hereditary factors<sup>[18]</sup>.

**Prevalence:** The prevalence of natal or neonatal teeth varies widely, from 1:1000 to 2:500 live births. Natal teeth are more frequent than neonatal teeth with a ratio of approximately 3:1<sup>[19, 20]</sup>.

**Diagnosis:** "Natal teeth" are teeth that are present at birth, while "neonatal teeth" are those that erupt during the neonatal period (up to 30 days of age). Almost all of these teeth are normal primary complement and are often loose due to incomplete root development. They occur most frequently in the region of the mandibular central incisors followed by the upper incisors. Although trauma, infection, malnutrition, hormonal stimulation, superficially placed dental germs and maternal exposure to environmental toxins have been implicated as etiologic factors, the exact etiology of the condition is still unknown<sup>[18, 21]</sup>.

**Treatment:** Management of natal/neonatal teeth is governed by many factors, including prognosis of the tooth, risk of aspiration, difficulty in breastfeeding, risk of hemorrhage and beliefs/misconceptions that should be taken into account in treatment planning. It is also very important to rule out difficulty in feeding the mother or child due to tongue ulcerations. Polishing or smoothing of the incisal edges may be an alternative to extraction to prevent complications associated with these teeth<sup>[22]</sup>.

Natal and neonatal teeth should be considered to be critically important conditions as their presence can lead to numerous complications. Early detection and timely treatment are recommended<sup>[23]</sup>.

A major complication of natal/neonatal teeth is ulceration on the ventral surface of the tongue caused by the sharp incisal edge of the tooth. This condition is also known as Riga-Fede disease or syndrome<sup>[24]</sup>. This is a rare benign disease of the oral mucosa characterized by ulceration of the tongue caused

by frequent trauma generated by movement of the tongue against the lower incisors. Clinically, the appearance of this lesion is common on the tongue (60%) although it can appear in other places such as the lip, palate, alveolar ridge, vestibular mucosa or floor of the mouth [6].

Natal and neonatal teeth present an undefined etiology, but the most common is that the position of the superficial tooth germ that is above the alveolar bone, its prevalence varies between 1:1000 and 1:2500 being the most common natal teeth, the diagnosis is clinical since the natal teeth are present at birth and the neonatal teeth in the first 30 days of life, as treatment is the polishing or smoothing of the incisal edges to prevent the occurrence of Riga-Fede ulcer.

### 3.3 Congenital Epulis

Congenital epulis was first described by Neumann in 1871 and, as a result, has been called Neumann's tumor. The Greek term "epulis" means "on the gum". It is more specifically called "congenital granular cell epilus", and this is the title recommended by the World Health Organization [25].

**Etiology:** The lesion is composed of nests of polygonal cells, the nuclei are eccentrically located with an overall bland appearance [26]. The lesion will be non-neoplastic in nature because the clinical course is characterized by absence of growth after birth, regression during the first year of life and no recurrence despite incomplete excision [27].

**Prevalence:** The lesion occurs in females more than in males with a 10:1 ratio and is more common in the maxilla than in the mandible. Congenital epulis is reported to be an isolated finding without associated congenital anomalies [25, 28].

**Diagnosis:** It occurs mainly in the maxilla of newborns, characterized by a sheet-like proliferation of large polygonal cells with demarcated cell membrane, granular cytoplasm and uniform small nuclei [29].

Congenital epulis commonly presents in newborns, with a mass seen arising from the gingiva. The lesions are often covered with soft pink to red mucosa and are sometimes ulcerated. On palpation their consistency is firm, fibrous, smooth-surfaced and non-painful. The most common location is the anterior part of the upper alveolar ridge, usually in the region of the lateral incisors or canines. It is estimated to be 2 to 3 times more common to occur in the maxilla than in the mandible [30].

**Treatment:** Very small lesions are asymptomatic and sometimes regress spontaneously. Large lesions that interfere with feeding and breathing require immediate surgical intervention, i.e., simple surgical excision under local or general anesthesia. Surgical excision is curative, and recurrence has not been reported; surgical excision is one of the most common treatment options [31, 32].

Congenital epulis is not a common lesion, it is composed of polygonal cells, and is of non-neoplastic origin, it occurs more in men than in women with a ratio of 10:1 and more common in the maxilla, it is characterized as a mass arising from the gingiva, pink to red, it can be ulcerated, its palpation is firm, fibrous and smooth surface, more common in the region of lateral incisors or canines, its treatment is surgical excision and there is usually no recurrence.

### 3.4 Hemangioma

Hemangioma, also called infantile hemangioma is a

congenital soft tissue vascular tumor, defined as a vascular lesion present in the newborn, with a progressive age-related pattern of development [33]. It is the most common benign tumor of the blood vessels in infants and children; 80% of these tumors occur as isolated entities, the condition is more common in premature low birth weight (<1000 g), decreasing gestational age, white girls and twins [34]. Other associated risk factors are multiple gestation pregnancy, gestational hypertension, placenta previa, preeclampsia, chronic villus sampling and prenatal vaginal bleeding [35].

**Etiology:** Hemangioma is a benign vascular tumor formed by abnormal endothelial cell proliferation and vascular proliferation and is distributed in the head, neck and face [36]. It arises from a rapid proliferation of endothelial cells followed by gradual involution. It can sometimes be missed at birth, but then may be noted during the first 8 weeks of life [33]. In most cases, the growth of hemangiomas in infants is the most rapid and significant in infants 1-3 months of age and gradually decreases after 5 months of age [37]. The tumor exhibits rapid growth and expansion with endothelial cell proliferation during the first five to six months of life, followed by gradual self-involution to near complete resolution [38].

**Prevalence:** Infantile hemangiomas are the most common type of vascular tumors, with an incidence ranging from 4% to 5%. Up to 10% of non-Hispanic Caucasian infants have this disease; it also affects more females than males and is more prevalent in premature, low birth weight and multiple birth babies. And with a higher prevalence in female patients of 2:1 [38, 39].

**Diagnosis:** Diagnosis is usually clinical due to its specific characteristics in terms of color and location, biopsy is the most accurate way of diagnosis, its location is more common in the lip, it can be diagnosed with magnetic resonance imaging [33, 38].

**Treatment:** Hemangiomas in the neonate usually disappear spontaneously with age, but surgical excision is performed in case of complications such as ulceration, infection, bleeding or airway obstruction; corticosteroids have also been useful to reduce the size of the lesion [40, 41].

Hemangioma is the most common benign tumor of blood vessels, it is a vascular tumor that usually occurs in the head, neck and face, being the oral cavity a common place where we find it, it is fast growing, but it stops after approximately 5 months. They present an incidence of 4 to 10% more in women than in men, is diagnosed clinically and can be useful an MRI or CT scan, treatment may disappear spontaneously, in case of complication perform surgical excision.

## 4. Conclusions

The most common alterations found in the oral cavity of newborns are different, we have as the most common inclusion cysts, natal and neonatal teeth, congenital epulis and hemangioma, these are lesions that usually appear in infant or newborn pediatric patients, they are benign alterations, their treatments vary, but these are usually benign, without the need for urgent treatment. Our job as pediatric dentists is to reassure parents, since they are usually alterations that can have an impact or cause uneasiness, with a correct diagnosis we can evaluate the alteration and provide the appropriate treatment or care.

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