



Natal and neonatal teeth: review of the literature

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Abstract

Child development from conception through the first years of life is marked by many changes. Tooth eruption follows a chronology corresponding to the date when the tooth erupts into the oral cavity. These dates have been established in the literature and are subjected to small variations depending on hereditary, endocrine and environmental features. At times, however, the chronology of tooth eruption suffers a more significant alteration in terms of onset, and the first teeth may be present at birth or arise during the first month of life. The expectations about the eruption of the first teeth are great and even greater when the teeth appear early in the oral cavity. The objective of the present study was to present a review of the literature with important aspects about natal and neonatal teeth. (Pediatr Dent 23:158-162, 2001)

One of the current guiding principles of dentistry is to provide early full infant care during the first year of life as a way of maintaining oral health. For this, it is necessary to know the dental needs occurring at this age in order to opt for more preventive conduct.

Child development from conception through the first years of life is marked by many changes. Tooth eruption at about 6 months of age is a milestone both in terms of functional and psychological changes in the child's life and in emotional terms for the parents. The expectations about the eruption of the first teeth are great and are greater when the teeth appear early in the oral cavity. On this basis, when teeth are observed at birth or during the first 30 days of life, being denoted natal and neonatal teeth, respectively, the interest, curiosity, and concern of clinicians are similar to that of the parents.

Because of its rare occurrence, in the past this anomaly of eruption was associated with superstition and folklore, being related to good or bad omens. This explains the many reports about this topic since 59 B.C., as observed in cuneiform inscriptions detected in the 19th century.¹ Today, these teeth also stimulate the interest of both parents and health professionals because of their clinical characteristics, among them their great mobility, which raises concern about the possibility of their being swallowed or aspirated by the infant during nursing. In view of the above considerations, the objective of the present study was to present a review of the literature and clinical management techniques for natal and neonatal teeth.

Literature review

History

Tooth eruption follows a chronology corresponding to the date when the tooth erupts into the oral cavity. This date has been established in the literature and is subject to small variations depending on hereditary, endocrine and environmental features. At times, however, the chronology of tooth eruption suffers a more significant alteration in terms of onset, with the possibility that the first teeth will be present at birth or arise during the first month of life.

Several terms have been used in the literature to designate teeth that erupt before the normal time, such as congenital teeth, fetal teeth, predecidual teeth, and dentitia praecox.² According to the definition presented by Massler and Savara (1950),³ taking only the time of eruption as reference, natal teeth are those observable in the oral cavity at birth and neonatal teeth are those that erupt during the first 30 days of life. This definition has been accepted and utilized by most authors.²⁻⁹

This condition has been the subject of curiosity and study since the beginning of time, being surrounded by beliefs and assumptions. Titus Livius, in 59 B.C., considered natal teeth to be a prediction of disastrous events. Caius Plinius Secundus (the Elder), in 23 B.C., believed that a splendid future awaited male infants with natal teeth, whereas the same phenomenon was a bad omen for girls. In Poland, India, and Africa, superstition prevailed for a long time, and in many African tribes children born with teeth were murdered soon after birth because they were believed to bring misfortune to all they would contact.⁵

The presence of teeth at birth was considered a bad omen by the family of Chinese children, who believed that when these natal teeth would start to bite one of the parents would die.⁵ In England, the belief was that babies born with teeth would grow to be famous soldiers, whereas in France and Italy the belief was that this condition would guarantee the conquest of the world. Historical figures such as Zoroaster, Hannibal, Luis XIV, Mazarin, Richelieu, Mirabeau, Richard III, and Napoleon may also have been favored by the presence of natal teeth.^{2,4,5}

Table 1. Prevalence of Natal and Neonatal Teeth Reported in the Literature

Authors	Prevalence	No. of children in the sample
Magitot, 1876	1:6000	17,578
Puech, 1876	1:30000	60,000
Ballantyne, 1897	1:6000	17,578
Massler & Savara, 1950	1:2000	6,000
Allwright, 1958	1:3408	6,817
Bodenhoff, 1959	1:3000	—
Wong, 1962	1:3000	—
Bodenhoff & Gorlin, 1963	1:3000	—
Mayhall, 1967	1:1125	90
Chow, 1980	1:2000 to 3500	—
Anderson, 1982	1:800	—
Kates et al., 1984	1:3667	7,155
Leung, 1986	1:3392	50,892
Bedi & Yan, 1990	1:1442	—
Rusmah, 1991	1:2325	9,600
To, 1991	1:1118	53,678
Almeida & Gomide, 1996	1:21.6	1,019

Adapted of Almeida & Gomide, 1996.¹⁰

Prevalence

The prevalence of this phenomenon—reported in the literature, is summarized in Table 1, and it is a somewhat rare event.

The variation in prevalence observed in Table 1 depends on the different populations studied and on the methods employed in each study. In the case of the high prevalence in children with cleft lip-palate reported by Almeida and Gomide (1996)¹⁰, the authors attributed this dental disorder to alveolar fissures and to the superficial position of the teeth in this region.

Gender

With respect to gender, there was no difference in prevalence between males and females.¹¹ However, a predilection for females was cited by some authors,^{4,11,12,13,14,15} with Kates et al (1984)¹⁴ reporting a 66% proportion for females against a 31% proportion for males.

Etiology

The presence of natal and neonatal teeth is definitely a disturbance of biological chronology whose etiology is still unknown.⁸ It has been related to several factors, such as superficial position of the germ,^{16,17} infection or malnutrition¹, febrile states,¹⁸ eruption accelerated by febrile incidents or hormonal stimulation,⁸ hereditary transmission of a dominant autosomal gene,^{17,19,20} osteoblastic activity inside the germ area related to the remodeling phenomenon,²¹ and hypovitaminosis.¹³

There is no conclusive evidence of a correlation between early eruption and some systemic condition or syndrome. Some investigators, however, suggest that natal teeth may be associated with some syndromes such as Hallerman-Streiff,^{12,22} Ellis-Van Creveld,¹² craniofacial dysostosis, multiple

steacystoma,²³ congenital pachyonychia,¹⁷ and Sotos Syndrome.⁸

Leung (1986),¹ in a 17-year retrospective study of 50,892 records for children born at the Foothills Provincial Hospital, Calgary, Canada, detected the occurrence of natal teeth in 15 infants, 5 of whom presented one of the following anomalies: cleft palate, Pierre Robin syndrome, Ellis-van Creveld syndrome, hypocalcemia with fracture of the ribs and rickets, and adrenogenital syndrome with 18-hydroxylase deficiency.

There are no studies available that confirm a causal relationship with any of the theories proposed thus far. However, the superficial position of the germ associated with a hereditary factor seems to be the most accepted possibility. There is general agreement in the literature that the etiology of natal and neonatal teeth requires further study.¹⁸

Fauconnier and Gerardy (1953)²⁴ presented an excellent discussion of the difference between “early eruption” and “premature eruption” in which they also proposed an etiology of natal and neonatal teeth. They considered “early eruption” to be that occurring because of changes in the endocrine system, whereas “premature eruption” would be a clearly pathological phenomenon with the formation of an incomplete rootless tooth that would exfoliate within a short period of time. This structure, designated “expulsive Capdepont follicle,” may result from trauma to the alveolar margin during delivery, with the resulting ulcer acting as a route of infection up to the dental follicle through the gubernacular canal, causing premature loss of the tooth.

According to Costa (1952),²⁵ early eruption in infants of a few days of age has been confused with a special pathological process described by Capdepont under the name of expulsive folliculitis. According to this author, infection of the follicle affects the gubernaculum dentis persistente, causing phlegmasia and turgidity of follicular tissues. This infection may be caused by an exogenous factor brought about by traumatic injury, such as the introduction of a finger into the baby’s mouth by the obstetrician during the Moriceau maneuver (a process of dislodgment of the fetus’s head retained in the pulvian excavation or in the soft pelvis).

The distinction between true early eruption and expulsive folliculitis has been established on the basis of the following characteristics:²⁵

- in expulsive folliculitis, rapid tooth eruption (2 to 3 mm in one day) was noted, together with extreme mobility, and turgidity and inflammation of the gingiva in the eruption zone;
- in true early eruption, solidity and normal eruptive path of the tooth were observed, with integrity of the gingival mucosa.

Clinical characteristics

Morphologically, natal and neonatal teeth may be conical or may be of normal size and shape and opaque yellow-brownish in color.²⁶ According to Bigeard et al (1966),⁸ the dimensions of the crown of these teeth are smaller than those obtained by Lautrou (1986)²⁶ for primary teeth under normal conditions.

The terms natal and neonatal tooth proposed by Massler and Savara (1950)³ were limited only to the time of eruption and not to the anatomical, morphological and structural characteristics.²⁶ Spouge and Feasby (1966)²⁸ recognized the need

to classify these teeth. On the basis of clinical characteristics, these teeth were then classified into:

Mature—when they are fully developed in shape and comparable in morphology to the primary teeth; immature—when their structure and development are incomplete.

The term mature may suggest that the tooth is well-developed compared to the remainder of the primary dentition and that its prognosis is relatively good. In contrast, the term immature assumes the presence of an incomplete structure and implies a poorer prognosis for the tooth in question.¹² On the basis of literature data, Hebling (1997)⁹ recently classified natal teeth into 4 clinical categories:

1. shell-shaped crown poorly fixed to the alveolus by gingival tissue and absence of a root;
2. solid crown poorly fixed to the alveolus by gingival tissue and little or no root;
3. eruption of the incisal margin of the crown through gingival tissue;
4. edema of gingival tissue with an unerupted but palpable tooth.

Histological characteristics

Histological investigations have demonstrated that most of the crowns of natal and neonatal teeth are covered with hypoplastic enamel with varying degrees of severity,^{13,16, 21,26,29} absence of root formation, ample and vascularized pulp, irregular dentin formation, and lack of cementum formation.^{5,19} With respect to dentin, Howkins (1932)²⁹ examined natal tooth sections under the microscope and observed normal dentin, except for certain irregular spaces in the region close to the amelodentinal union, as well as a larger pulp chamber. Microscopically irregular interglobular areas with structures resembling osteodentin have been observed, as well as an atypical arrangement of dentinal tubules^{13,30} and a gradual decrease in the number of dentinal tubules from the crown to the cervical region.²⁶

Friend et al (1991),⁷ in a clinical and histological report on an upper natal molar, proposed that the alteration in amelogenesis detected was due to premature exposure of the tooth to the oral cavity, which resulted in metaplastic alteration of the epithelium of the normally columnar enamel to a stratified squamous configuration. This squamous aspect of enamel was clearly visualized in the study by Bigeard et al (1966),⁸ whose objective was to specify the characteristics of enamel and dentin of a natal tooth using scanning electron microscopy. In that study, dentin did not differ significantly from that of normal primary teeth.

Diagnosis

The importance of a correct diagnosis of natal and neonatal teeth has been pointed out by several investigators^{1,9,26,31,32,33} who used clinical and radiographic findings in order to determine whether these teeth belonged to the normal dentition or were supernumerary, so that no indiscriminate extractions would be performed.

A radiographic verification of the relationship between a natal and/or neonatal tooth and adjacent structures, nearby teeth, and the presence or absence of a germ in the primary tooth area would determine whether or not the latter belongs to the normal dentition.³³ It should be pointed out that most natal and neonatal teeth are primary teeth of the normal den-

tion and not supernumerary teeth.⁶ These teeth are usually located in the region of the lower incisors,^{5,34} are double in 61% of cases^{4, 14} and correspond to teeth of the normal primary dentition in 95% of cases, while 5% are supernumerary.²⁹

Ooshima et al (1986)³⁵ emphasized that multiple natal teeth are extremely rare. However, some rare reports are available in the literature about the involvement of natal molars and canines.^{7,36,37} According to Bodenhoff and Gorlin (1963),⁵ 85% of the teeth involved are lower incisors, 11% are upper incisors, 3% are lower canines and molars, and only 1% are upper canines and molars. Tay (1970)³⁶ reported a case of natal teeth in which a second upper molar and a lower canine were involved.

Other oral manifestations that may be confused with the dental conditions in question are cysts of the dental lamina and Bohn nodules,³² both differentiated from natal and neonatal teeth by radiographic examination.

According to the above citations, diagnosis is important for the maintenance of natal and neonatal teeth of the normal dentition, since the premature loss of a primary tooth may cause a loss of space and collapse of the developing mandibular arch,⁹ with consequent malocclusion in permanent dentition.³⁷

Complications and treatment

The presence of natal and neonatal teeth may be a source of doubt about the treatment plan. In the decision of maintaining or not these teeth in the oral cavity, some factors should be considered, such as implantation and degree of mobility, inconveniences during suckling, interference with breast feeding, possibility of traumatic injury, and whether the tooth is part of the normal dentition or is supernumerary.³⁸

If the erupted tooth is diagnosed as a tooth of the normal dentition, each of the other situations mentioned above should be considered. The maintenance of these teeth in the mouth is the first treatment option, unless this would cause injury to the baby.^{12, 39} When well implanted, these teeth should be left in the arch and their removal should be indicated only when they interfere with feeding or when they are highly mobile, with the risk of aspiration.⁴⁰

Although many investigators have mentioned the possibility of aspiration of these teeth, this risk, in reality, is an unlikely possibility since there are no reports in the literature of the actual occurrence of aspiration. However, cases of spontaneous tooth exfoliation have been reported.^{19,35,41} On the basis of the report by the parents of a 28-day old baby of the sudden disappearance of a natal tooth, Bigeard et al (1996)⁸ suspected that this tooth was swallowed, a fact that indicates the possibility of aspiration.

The risk of dislocation and consequent aspiration, in addition to traumatic injury to the baby's tongue and/or to the maternal breast, have been described as reasons for removal.^{1, 4, 19, 26, 42} Smoothing of the incisal margin was the option reported by Martins et al (1998)⁴² to prevent wounding of the maternal breast during breast feeding.

In contrast to the previous authors,^{1,4,19,26,42} Hals (1957),¹⁹ Zhu and King (1995),² and Walter et al (1996),³² reported that there was no relationship between wounding of the mother's nipple and the presence of natal teeth since the tongue is interposed between these teeth and the nipple during breast feeding. Thus, traumatic injury would occur only to the baby's tongue. This condition was first described by Caldarelli in 1857

in association with general organ failure in a child, followed by death. Riga and Fede histologically described the lesion, which then started to be called Riga-Fede disease.⁴³ According to other investigators^{44,45,46}, the detection of this lesion is an indication for tooth extraction.

Among the clinical reports that consider natal and neonatal teeth to be the cause of sublingual ulceration caused by suckling, Kinirons (1985)⁴⁶ described a highly peculiar situation (ie, the birth of a baby with a natal tooth and the presence of a sublingual ulcer observed immediately after birth which, according to the author, had probably been caused by suction during intrauterine life). The treatment option in this case was extraction.

According to Allwright (1958)⁴ and Zhu and King (1995),² the Riga-Fede disease does not represent, by itself, an indication for extraction since an acute incisal margin can be relieved by smoothing. Goho (1996)⁴⁷ reported his treatment of a natal tooth as covering the incisal portion of the tooth with composite resin. Tomizawa et al (1989)¹⁵ reported two cases of treatment of Riga-Fede disease by covering the incisal margin with photopolymerizable resin, which aided rapid healing of the ulcers.

If the treatment option is extraction, this procedure should not pose any difficulties since these teeth can be removed with a forceps or even with the fingers.²⁰ However, the cited author²⁰ emphasized the precautions that should be taken when extracting natal and/or neonatal teeth: avoiding extraction up to the 10th day of life to prevent hemorrhage, assessing the need to administer vitamin K before extraction, considering the general health condition of the baby, avoiding unnecessary injury to the gingiva, and being alert to the risk of aspiration during removal.

According to Rusmah (1991),²⁶ tooth extraction is contraindicated in newborns because of the risk of hemorrhage. However, administration of vitamin K before the procedure permits safe extraction. Berendsen and Wakkerman (1998)⁴⁸ also mentioned the risk of hemorrhage in extractions performed before 10 days of life when vitamin K was not administered.

Allwright (1958)⁴ reported the extraction of 25 natal and neonatal teeth in 15 babies with no episode of hemorrhage even though no therapeutic precaution had been taken. However, all the extractions reported by the author were performed in babies older than 20 days.

This waiting period before performing tooth extraction is due to the need to wait for the commensal flora of the intestine to become established and to produce vitamin K, which is essential for the production of prothrombin in the liver.^{4, 26} Thus, it is safer to wait until a child is 10 days old before extracting the tooth. If it is not possible to wait then it is advisable to evaluate the need for administration of vitamin K with a pediatrician, if the newborn was not medicated with vitamin K immediately after birth. Vitamin K (0.5-1.0 mg) is administered intramuscularly to the baby as part of immediate medical care to prevent hemorrhagic disease of the newborn.⁴⁹

As postulated since 1912, the coronary "bulb" would disappear a few days later⁴¹ after extraction of a dental tooth. Decades later, Ryba and Kramer (1962)⁵⁰ and Southam (1968)⁵¹ reported the possibility of continuous dentin formation by the remaining dental papilla, with the permanence of part of the radicular epithelial sheath of Hertwig retained on the sides of the papilla soon after crown extraction, represent-

ing the necessary epithelial stimulus. Ooshima et al (1986)³⁵ also reported a case of formation of dentin and a root after exfoliation of a natal tooth.

Berendsen and Wakkerman (1988)⁴⁸ reported a case of eruption of tooth-like structures after extraction of two neonatal teeth in the region of the lower incisors, which persisted in the oral cavity up to five years of age, when they naturally exfoliated. The decision to keep these teeth or not is based on the basic necessity of survival of living beings (ie, the possibility of feeding).³⁴

Concerns such as premature loss of a primary tooth as a function of the possible loss of space for the permanent tooth have been voiced by Leung (1986).¹ Other concerns expressed include the need for prevention of dental caries^{32,52} by controlling bacterial plaque and via periodical fluoride application, since in these teeth which erupt prematurely, mineralization is not complete.

Conclusions

This literature review leads to the following conclusions:

1. Natal and neonatal teeth are rare events in the oral cavity;
2. The decision to keep or to extract a natal and/or neonatal tooth should be evaluated in each case, keeping in mind scientific knowledge, clinical common sense, and parental opinion after the parents are properly informed about all aspects involved in this situation;
3. Radiographic examination is an essential auxiliary tool for the differential diagnosis between supernumerary primary teeth and teeth of the normal dentition. When the teeth are supernumerary, they should be extracted. In this procedure, the clinician should first consider the well being of the patient and assess the risk of hemorrhage due to the hypoprothrombinemia commonly present in newborns. Teeth of the normal dentition, when considered mature, should be preserved and maintained in healthy conditions in the baby's mouth using all possible clinical resources.
4. Periodic follow-up by pediatric dentists is of fundamental importance, as also are recommendations to the parents with respect to home dental hygiene and the use of fluoride.

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