

Neonatal teeth: Importance of histological findings in management update



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Abstract

Background Presence of teeth in a newborn represents a rare finding and a disturbance of biological chronology of teeth. The aim of this paper is to report two cases with neonatal teeth histologically examined.

Case report In this paper two cases of patients with neonatal teeth are reported and histological examinations of three extracted teeth are described. We report an exceptional finding in one of the neonatal teeth microscopically examined: a massive inflammatory infiltration in the pulp tissue similar to that in pulpitis.

Results The management of natal and neonatal teeth usually includes the extraction in case of ulceration on the tongue or severe tooth mobility to prevent accidental inhalation or feeding disturbances. The presence of an inflammatory infiltration of pulp tissue in one of teeth histologically examined suggests to review the indications for extraction considered to date.

Conclusions The management of natal and neonatal teeth should consider the presence of an inflammatory infiltration of pulp tissue. An anamnestic interview is advisable in order to deeply investigate about possible behaviours of the child due to pain or discomfort.

KEYWORDS Extraction; Histological findings; Inflammatory infiltration; Neonatal teeth.

Introduction

Natal teeth are defined as teeth that are present at birth, while neonatal teeth are those that erupt during the first 30 days of life, frequently in both cases are deciduous teeth prematurely erupted, less frequently they are supernumerary teeth [Massler and Savara, 1950; Mhaske et al., 2013]. The aetiology of this early eruption is still unclear, though several factors are described in literature: transmission of a dominant autosomal gene, endocrinal disturbances, superficial positioning of tooth germ, osteoblastic hyperactivity, syphilis infections [Maheswari et al., 2012; Shini et al., 2018]. Some authors suggest a possible hereditary origin due to a positive family history present in many cases and also an association with antenatal and neonatal complications [Kana et al., 2013].

Furthermore natal and neonatal teeth may be associated with anxiety and culturally prevalent misconceptions [Leung and Robson, 2006]. In a recent review, Mhaske et al. [2013] reported that the incidence of natal and neonatal teeth ranges from 1:2,000 to 1:3,500 live births and that natal teeth are more frequent than neonatal, with a ratio of 3:1. On the other hand, in their systematic review Kana et al. [2013] reported very different data in the analysed studies and they concluded that "the prevalence of natal teeth needs more research in order to be more precise". Furthermore they highlighted that the prevalence of neonatal teeth is more difficult to monitor compared to natal teeth so that they might have a very significant underestimation. Controversial data are reported about difference between sexes [Khandelwal et al., 2013], but some studies reported that prevalence is higher in females than in males [Mhaske et al., 2013; Khandelwal et al., 2013; Freudenberger et al., 2008; Chun-Hsiang et al., 2017].

The most common region of eruption is in the central mandible: 85% are mandibular incisors, 11% are maxillary incisors, 3% are mandibular canines and molars, and 1% are maxillary canine or molars [Mhaske et al., 2013]. Hebling et al. [1997] classified natal teeth into four clinical categories: 1) shell-shaped crown that is poorly fixed to the alveolus by gingival tissue with root absence, 2) solid crown that is poorly fixed to the alveolus by gingival tissue with little or no root, 3) eruption of the incisal margin of the crown through the gingival tissues, and 4) gingival oedema with palpable but unerupted tooth. In the literature only few papers report on the histological aspects of natal and neonatal teeth [Mhaske et al., 2013; Maheswari et al., 2012; Bulut et al., 2019]. The authors who performed the microscopic analysis of these teeth described normal pulp tissue or areas of pulp tissue involved into an inflammatory reaction or hyperaemia with presence of thick blood vessels [Mhaske et al., 2013; Maheswari et al., 2012; Bulut et al., 2019].

The aim of this paper is to report two cases with neonatal teeth histologically examined, in order to suggest a possible update of current management.

Case reports

Case 1

A 15-day-old male patient referred to the Dentistry Unit of Bambino Gesù Children's Research Hospital in Rome for the

presence of a tooth in the lower jaw. He was in good general health, and regularly breastfed. Parents reported that the child sometimes appeared agitated and cried for no apparent reason. The intraoral examination revealed the presence of a single tooth in the anterior lower jaw. This neonatal tooth was category 2 according to Hebling's classification and it was affected by a considerable mobility. In order to avoid accidental inhalation and pain during breastfeeding, the extraction of the tooth was planned and carried out in the same clinical session. The dentist ensured the newborn had received a vitamin K dose at birth and X-ray examination was not performed due to young age of the patient.

Neonatal tooth crown was similar in shape to that of a lower deciduous incisor, the root was rudimentary and incomplete (Fig. 1).

The sample was processed with haematoxylin and eosin staining and decalcified longitudinal sections were studied. Histological examination revealed a thin hypoplastic enamel layer, which is a common finding in natal and neonatal teeth [Bulut et al., 2019] and large inflammatory infiltration of the pulp tissue (Fig. 2). This peculiar condition of the pulp tissue was compatible with pulpitis of neonatal tooth.

Case 2

A 14-day-old female patient referred to the Dentistry Unit of Bambino Gesù Children's Research Hospital in Rome for presence of two teeth in the lower jaw. She was in good general health and regularly breastfed. Intraoral examination showed two neonatal teeth in the 3.1 and 4.1 areas, category 1 of Hebling's classification [1997], both affected by considerable mobility at risk for accidental inhalation. As the newborn had received vitamin K dose at birth, the extraction of the teeth was planned and carried out in the same clinical session without any X-ray examination. The crowns of the extracted teeth were similar in shape to those of lower incisors and they were histologically examined following haematoxylin and eosin staining. The microscopic analysis of longitudinal section of two teeth showed hypoplastic, thin, enamel layer and multiple hyperemic vessels in pulp tissue with several erythrocyte aggregates (Fig. 3).

Discussion and conclusions

The major complication from natal or neonatal teeth, known

as Riga-Fede disease (or syndrome), is the ulceration on the ventral surface of the tongue caused by repeated trauma due to the tooth's sharp incisal edge [Freudenberger et al., 2008; Bulut et al., 2019]. This condition needs an early diagnosis to avoid risky complications for newborn's health [Picciotti et al., 2014]. Other complications reported are nutritional deficiencies, because breastfeeding might be painful for the mother, and risk of tooth inhalation due to accidental detachment of the tooth if it is affected by considerable mobility [Mhaske et al., 2013].

Current opinion recommends to extract neonatal teeth in presence of complications. i.e.: mobility higher than 1 mm due to the risk of aspirating or ingesting natal teeth, feeding difficulties, or Riga-Fede syndrome [Baroni et al., 2006; Chun-Hsiang et al., 2017; Maheswari et al., 2012; Costacurta et al., 2018]. In our patients the indication for extraction was mainly related to the presence of severe mobility of all three teeth.

When possible, natal/neonatal teeth extraction should be deferred after the child is 10 days of age or more, in order to allow the normal flora of the intestine to produce vitamin K, an essential factor for prothrombin production in the liver [Cunha et al., 2001]. The American Academy of Pediatrics [1961] recommends that all newborns immediately after birth should be given a single intramuscular dose of 0.5 to 1 mg of vitamin K for prevention of Vitamin K Deficiency Bleeding (VKDB). The two patients described in this paper were both older than 10 days and had received parenteral dose of vitamin K at birth, so the risk of haemorrhage during extractions was negligible.

The histological examination of teeth of Case 2 showed hyperaemia and thick blood vessels. These results are similar to those described in literature that show normal microscopic structure in pulp tissue of neonatal and natal teeth [Mhaske et al., 2013; Bulut et al., 2019].

On the contrary, in the first case reported the histological results showed something new, that is the presence of a widely spread inflammatory infiltration similar to that found in pulpitis. Mhaske et al. [2013] reported some authors showed the presence of "inflammatory areas" but to date there is no evidence in literature of widespread phlogistic infiltrate from pulpitis in natal or neonatal teeth. Our results might be an explanation for what reported by the parents about the state of agitation of child. On the other hand, pain may not be present due to the incomplete shape of tooth and pulp chamber, that do not allow the arising of internal pressure and subsequent toothache.



FIG. 1 Natal tooth after extraction.

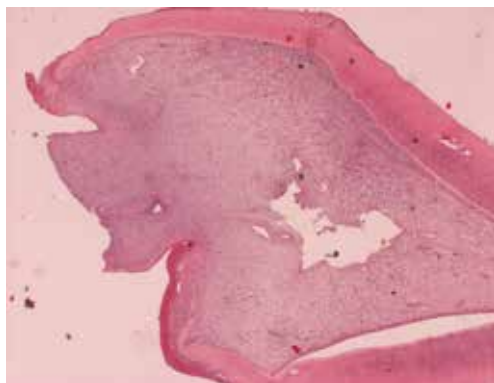


FIG. 2 Optical microscopic longitudinal section obtained after demineralisation. Haematoxylin and eosin stained specimens. This section shows an inflammatory infiltration spread all over the pulp.

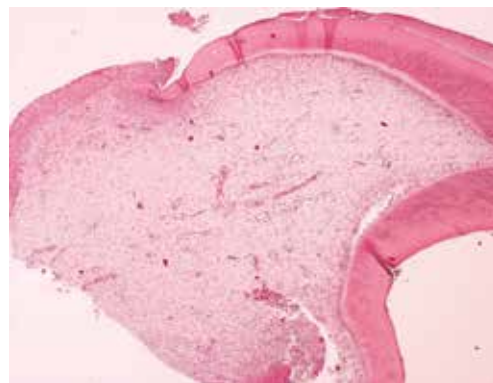


FIG. 3 Optical microscopic longitudinal section after demineralisation (Haematoxylin and eosin), showing an increased diameter of several blood vessels and the presence of erythrocyte aggregates in the pulp.

In conclusions, according to these evidences the management of natal and neonatal teeth should consider the presence of an inflammatory infiltration of pulp tissue. It is advisable that anamnestic interview is carried out in order to deeply investigate about possible behaviours of the child due to pain or discomfort.

Of course, further investigations are needed to confirm the presence of pulp inflammation in natal and neonatal teeth. In the case of confirmation of our results by other studies, extraction should be carried out as soon as possible even in the absence of the complications considered. The presence of an inflammatory reaction may induce discomfort to the patient and a prolonged exposure may determine the risk of development of systemic inflammatory disease, as recently described in literature [Radwan-Oczko et al., 2019]. On the other hand, recent papers [Pisal et al., 2018; Shetty et al., 2018] evidenced that natal teeth, as well as deciduous teeth in general [Paglia, 2016], are a potential source for stem cells [Caruso et al., 2014; Campanella, 2018]. Therefore the extraction of natal/neonatal teeth might also assume an important role for dental tissue regeneration in the future.

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