Riga–Fede disease: A systematic review and report of two cases



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Abstract

Aim The term Riga-Fede disease has been used historically to describe traumatic ulceration that occurs on the ventral surface of tongue, buccal mucosa, gum or floor of the tongue in newborns and infants. It is most often associated with natal and neonatal teeth in newborns. The painful symptoms may be absent or acute, up to the point of preventing the baby from feeding. The aim of this work is to offer a description of the therapeutic solutions for the treatment of this pathological condition, with a review of the literature and the report of two cases.

Materials and methods A systematic review of the literature of articles presenting Riga-Fede Disease associated with natal and neonatal teeth was performed following the PRISMA protocol (Prefered Reporting Items for Systematic Reviews and Meta-Analyses). This bibliographic search was performed through two databases, PubMed and Google Scholar.

Results Fifty-two articles were included as they were compatible with the relevant inclusion criteria, with a total of 57 case reports of Riga-Fede disease associated with natal and neonatal teeth. A statistical analysis of the results was then carried out. A single treatment was performed in 44 patients; of these, 36 patients underwent extraction only (81.8%), 3 were treated with excisional biopsy (6.9%), 2 treated with occlusal plate (4.5%), 1 received ameloplasty only (2.3%) and 2 patients underwent a direct restoration of the incisal margin (5.8%), 13 patients received a combined treatment which saw the use of corticosteroids in 5 patients, lidocaine gel in 2 patients, topical benzocaine in 2 patients, H_2O_2 in 1 patient, Vasa (acantacea plant) in 1 patient, low laser therapy in 1 patient, and a single patient received fluoride varnish.

Conclusions Extraction and ameloplasty are the most effective treatments in the resolution of the Riga-Fede disease associated with natal/neonatal teeth. In the case of high dental mobility, resulting in an increased risk of exfoliation and possible tooth ingestion/inhalation, extraction is the therapeutic treatment of choice. When nutrition is not compromised, ameloplasty is the treatment of choice, as it is less invasive and more conservative.

KEYWORDS Riga-Fede disease; Natal teeth; Neonatal teeth.

Introduction

Natal teeth are defined as teeth present at birth and neonatal teeth those that erupt within the first month of life [Massler and Savara, 1950]. The incidence is estimated respectively in 1:2000 and 1:3500 [Mhaske et al., 2013], with a greater involvement of the lower incisors (85% of cases), while the upper central incisors are found in 11% of cases, and the remaining teeth accounts for 4%. Mostly, these teeth are not supernumerary, but in 90–99% of cases they belong to the deciduous dentition [Rao and Mathad, 2009]. The aetiology of this condition that leads to the formation of natal and neonatal teeth is unknown, but several hypotheses have been proposed. In particular, some studies report the autosomal dominant transmission of an unidentified genetic trait [Mhaske et al., 2013]. Some hypotheses support the possible key role of endocrine disorders, in particular those that origin from gonads, pituitary and thyroid glands. Among the predisposing factors of the onset of natal and neonatal teeth the literature describes poor maternal health, endocrine disorders, febrile episodes and congenital syphilis [Paglia, 2019; Paglia et al., 2019; Paglia et al., 2021; Mhaske et al., 2013; Leung and Robson, 2006]. Another thesis about the physiopathological mechanism of natal and neonatal teeth considers the role of excessive resorption of the overlying bone that would induce an early eruption of the teeth [Mhaske et al., 2013]. According to other authors, natal teeth seem to be related more to an accelerated or premature dental development pattern than a superficial positioning of dental germs in relation to the overlying bone [Stamfelj et al., 2010].

From an anatomical and structural standpoint, natal and neonatal teeth appear underdeveloped [Cunha et al., 2001] and the root formation is frequently incomplete [Iandolo et al., 2019; Cunha et al., 2001]. This leads to high crown mobility which might cause possible accidental avulsion, with the risk of inhalation or ingestion of the tooth [Cunha et al., 2001; Senanayake et al., 2014]. The crowns are generally normal both in shape and size. Histologically they appear hypomature with well-organised hard tissues [Senanayake et al., 2014]. In neonatal teeth microscopically and histologically examined, the presence of a massive inflammatory infiltration in pulp tissue, similar to that in pulpitis, has been reported [Festa et al., 2020]. The issues linked to the presence of the lower incisors at birth are due to the traumatic action of their sharp margins against the tongue and oral mucous tissue. Those lesions can lead to the onset of Riga-Fede disease [Leung and Robson, 2006].

Riga-Fede disease (RFD) is a pathological benign condition characterised by the presence of ulcers on the tongue surface (60% of lesions), lips, palate, mucous membrane of the vestibule and the floor of the oral cavity [Joseph et al., 2010]. The lesions are caused by frequent traumatic injuries due to

the sharp action of the lower incisors [Baroni et al., 2006]. In 1881 an Italian doctor named Riga identified this for the first time, but the disease was described only 9 years later, in 1890, by Fede, who conducted the histological studies on the lesion [Baroni et al., 2006]. Ulcerous lesions may be unifocal or multifocal [Baroni et al., 2006] and may involve also the maternal breast due to traumatic breastfeeding [Jamani et al., 2018]. From a histopathological point of view, RFD in characterised by ulcerated mucosal areas, with granulation tissue and mixed inflammatory infiltrate, rich in lymphocytes, mast cells, macrophages and high levels of eosinophils. The diagnostic approach entails a clinical evaluation of the ulcerous lesions, considering size and anatomical site, and the research of the pathogenic noxa linked to the presence of natal and neonatal teeth with sharp incisal margins [Mhaske et al., 2013]. A differential diagnosis should be made with every condition that involves tongue and oral mucosa ulcerations, such as fungal or bacterial infections, allergies or immunological disease, cancers (traumatic neuroma, granular cells myoblastoma, lymphoma, lymphoangioma, salivary gland tumors or metastatic tumors) [Joseph et al., 2010], primary syphilis, tuberculosis, agranulocytosis [Ceyhan et al., 2009], genetic disease [Baroni et al., 2006; Li et al., 2016]. In patients who are unable to provide an adequate history, such as infants, the determination of a definitive clinical diagnosis is especially difficult. Most oral ulcers are caused by trauma or are aphthous.

The aim of this work was to analyse and discuss the different therapeutical approaches to RFD described in the literature by means of a systematic review and the presentation of two case reports.

Materials and methods

A systematic review of the literature of articles reporting on RFD associated with natal and neonatal teeth was performed. The search was performed independently by two authors, M.P. and G.S., who followed the PRISMA protocol (Preferred Reporting Items for Systematic Reviews and Meta-Analyses). This bibliographic search was performed through two databases, PubMed and Google Scholar, using "Riga-Fede disease", "Natal teeth", "Neonatal teeth" and "Natal and neonatal teeth" as keywords. Articles uploaded from 1990 to April 28, 2021 were included. All cases were cataloged and tabulated by author, year, age of patients, gender, type of natal/neonatal tooth present, area of the lesion, complications, type of treatment, healing time and dental mobility (Table 1).

Exclusion and inclusion criteria

Studies where RFD was not associated with natal/neonatal teeth were excluded, as well as articles where the treatment had not been described were also excluded. On the other hand, articles were included in which cases of RFD associated with the presence of natal/neonatal teeth were reported together with the description of the related treatment.

Data analysis

From an initial search, 520 articles related to the keywords entered were selected. Of these 81 were excluded as duplicates or full-text not available. Of the 439 remaining articles, 140 were considered eligible but 64 were excluded because, following the full-text analysis, they did not present clinical cases of RFD associated with natal/neonatal teeth and the related treatment. At the end of the screening, 68 articles were eventually included for analysis but only 52 are considered for qualitative analysis (Fig. 1).

Results

Fifty-two articles were included as they were compatible with the relevant inclusion criteria, for a total of 57 case reports of MRF associated with natal and neonatal teeth. A statistical analysis of the results was then carried out. The sample consisted of 57 subjects, of which 24 males (42%) and 33 females (58%) (Fig. 2). The age ranged from 0 (birth) to 4.5 months with an average age of 40.2 days. A total of 21 subjects had 2 lower natal incisors (36.8%), 15 had a lower natal incisor (26.3%), 9 a neonatal lower incisor (15.8%), 10 two neonatal lower incisors (17.5%), 1 two maxillary molars (1.8%) and 1 had two lower natal molars (1.8%) (Fig. 3). Ulcerative lesions affected the ventral surface of the tongue in 38 patients, i.e. 66.6% of cases, extended to the frenulum in 6 cases (10.,5%), in 5 cases the ulceration involved the sublingual area (8,7%), in 4 cases there was localised inflammation in the soft tissues (7%) and 1 case had a pyogenic granuloma (1.8%), and only one subject presented an oropharyngeal communication (1.8%), in 1 case at the level of the lingual dorsum (1.8%) and in 1 case at the level of the lower lip (1.8%) (Fig. 4). Regarding treatment, a single treatment was performed in 44 patients; of these, 36 patients underwent extraction only (81.8 %), 3 were treated with excisional biopsy (6.9%), 2 treated with occlusal plate (4.5%), 2 patients underwent a direct restoration of the incisal margin (5.8%) and only one subject was treated with ameloplasty (2.3%) (Fig. 5). The remaining 13 patients received a combined treatment which saw the use of corticosteroids in 5 patients, lidocaine gel in 2 patients, topical benzocaine in 2 patients, H_2O_2 in one patient, Vasa (acantacea plant) one patient, low laser therapy in one patient, and one patient received fluoride varnish (Fig. 6).

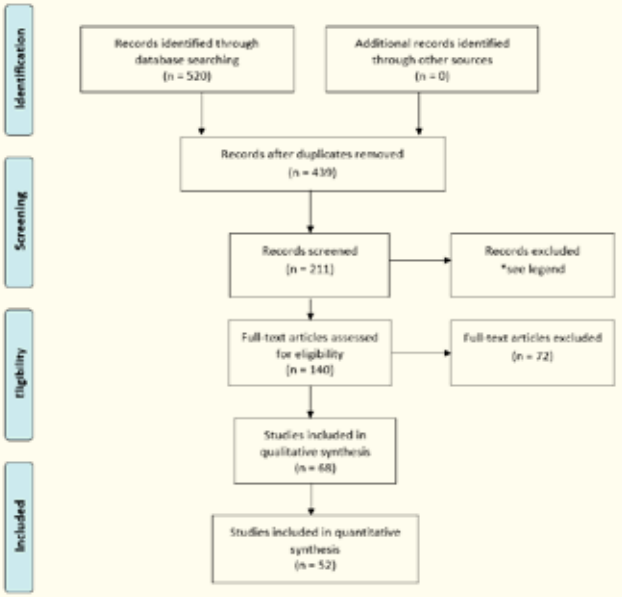


FIG. 1 Flow chart depicting the article selection process.
*Exclusion criteria: Studies were RFD was not associated with natal/neonatal teeth and articles in which no therapy had been described.

Author	Age/gender	Teeth	Site of the lesion	Treatment	Healing	Dental mobility
Eichenfield et al., 1990	Female 6 months (lesion present for 45 days)	2 neonatal lower incisors	Tongue ventral surface	Excisional biopsy	-	-
Buchanan et al., 1997	4 weeks (lesion present for 2,5 weeks)/ Male	2 natal lower incisors	Tongue ventral surface	Occlusal plate	21 days	NO
Uzamis et al., 1999	2 months / male	2 neonatal lower incisors	Sublingual area	Extraction	1 week	-
Rao et al., 200 1	25 days/ female	2 neonatal lower incisors	Tongue ventral surface	Extraction	2 days	YES
Anegundi et al. 2002 (case 1)	30 days / female	1 neonatal lower incisor	Localized gengival inflammation	Extraction	-	YES
Anegundi et al. 2002 (case 2)	7 days / female	2 lower natal incisors	Gum inflammation localized around the teeth	Extraction	-	YES
Anegundi et al. 2002 (case 3)	10 days/ male	2 lower natal molars	Gum inflammation localized around the teeth with necrotic material	Extraction	-	YES
Anegundi et al. 2002 (case 4)	5 days / female	2 lower natal incisors	-	Extraction	-	YES
Singh et al., 2004	4,5 months / male	1 lower natal incisor	Pyogenic granuloma	Excisional biopsy	-	-
Hedje, 2005	28 days / female	2 lower natal incisors	Tongue ventral surface / lingual frenulum	Extraction	10 days	YES
Jariwala et al., 2008	6 weeks / female	1 lower natal incisor	Sublingual area / Tongue ventral surface	Extraction	10 days	YES
Choi et al., 2009	2 months / female	1 lower natal incisor	Tongue ventral surface	Ameloplasty/ Corticosteroids	1 month	YES
Mathew et al., 2010	33 days / female	1 lower natal incisor	Tongue ventral surface	Extraction	4 days	YES
Moreira et al., 2010	2 months / female	2 lower natal incisors	Tongue ventral surface	Ameloplasty/ Vasa / Corticosteroids	10 days	YES
Nandikonda et al., 2010	10 days / female	2 lower natal incisors	Cleft palate/ oropharyngeal communication	Extraction	-	-
Padmanabhan et al., 2010	20 days / male	1 lower natal incisor	Lingual dorsum	Ameloplasty/ Corticosteroids	1 week	NO
Shetty et al., 2010	45 days / female	1 lower natal incisor	Tongue ventral surface	Extraction / lidocaine gel	-	YES
Kumar et al., 2011	3 months (lesion present for 2 months)/ Female	2 neonatal maxillary molars	Inflammation on hard palate	Extraction	-	YES
Samadi et al., 2011	3 months/ Male	1 natal lower incisor supernumerary	Tongue ventral surface	Extraction	4 weeks	YES
Saha et al., 2011	3 months/ Male	1 natal lower incisor	Tongue ventral surface/ lingual frenulium	Extraction	3 weeks	NO
Deep et al., 2011	20 days / female	1 lower natal incisor	Tongue ventral surface	Composite restoration	-	NO
Costacurta et al., 2012	2 months / female	2 neonatal lower incisors	Tongue ventral surface	Extraction	4 weeks	YES
Sharma et al., 2012	20 days / female	1 neonatal lower incisor	Tongue ventral surface / lingual frenulum	Extraction	-	YES
Van der Meij et al., 2012	6 months (lesion present for 3 months)/ male	2 neonatal lower incisors	Tongue ventral surface	Excisional biopsy	3 weeks	-
Grailon et al., 2013	45 days / male	1 lower natal incisor supernumerary	Tongue ventral surface	Extraction	3 weeks	YES
Parisay et al., 2013	38 days / female	1 neonatal lower incisor	Tongue ventral surface / lingual frenulum	Extraction	12 days	YES
Dunlop et al., 2013	2 months (lesion present for 2 weeks)/ Female	2 neonatal lower incisors	Tongue ventral surface	Extraction	7 days	YES
Patil et al., 2013	27 days / male	2 lower natal incisors	Tongue ventral suface / lingual frenulum	Extraction	10 days	YES
Devi et al., 2013	7 days/ Male	1 natal lower incisor	Tongue ventral surface	Extraction	10 days	YES

TABLE 1 Clinical case results included in the review.

Baldiwala et al., 2014	2,5 months/ male	2 lower natal incisors	Tongue ventral surface	Occlusal plate	3 weeks	NO
Jingarwar et al., 2014	17 days/ male	2 lower natal incisors	Tongue ventral surface	Composite restoration	1 month	NO
Nogueira et al., 2014 (case 1)	28 days/ female	2 lower natal incisors	Tongue ventral surface	Ameloplasty +vernice fluorata/ lidocaine gel 2% topic	10 days	-
Nogueira et al., 2014 (case 2)	6 days/ female	1 lower natal incisor	Tongue ventral surface	Extraction	10 days	-
Picciotti et al., 2014	37 days/ female	1 lower natal incisor	Tongue ventral surface	Extraction	3 weeks	YES
Singhal et al., 2014	3 months/ male	1 neonatal lower incisor	Tongue ventral surface	Extraction	1 week	NO
Basavraju et al., 2015	2,5 months/ male	2 lower natal incisors	Tongue ventral surface	Ameloplasty/ corticosteroids	1 week	NO
Bhatt et al., 2015	28 days/female	2 neonatal lower incisors	Tongue ventral surface	Ameloplasty	15 days	NO
Guzman et al., 2015	6 months (lesion present for 4 months)/ male	2 lower natal incisors	Tongue ventral surface	Ameloplasty/H2O2	21 days	-
Martins et al., 2015	15 days / female	2 neonatal lower incisors	Lower lip	Extraction	-	YES
Volpato et al., 2015	1 months/ female	2 lower natal incisors	Tongue ventral surface	Restoration with glass ionomer cement/ Extraction	15 days	YES
Nawaz et al., 2016	1 week/ female	1 lower natal incisor	Tongue ventral surface	Extraction	4 weeks	-
Alahmari et al., 2017	20 days/ female	1 neonatal lower incisor	Tongue ventral surface / lingual frenulum	Extraction	-	YES
Da Silva et al., 2017	43 days/female	1 neonatal lower incisor	Tongue ventral surface	Extraction +low level laser therapy + corticosteroids	10 days	YES
Danelon et al., 2017 (case 1)	2 months /female	2 lower natal incisors	Tongue ventral surface	Extraction	30 days	-
Danelon et al., 2017 (case 2)	2 months / female	2 lower natal incisors	Tongue ventral surface	Extraction	30 days	-
Kanamuri, 2017	4 days / male	2 lower natal incisors	Tongue ventral surface	Extraction	1 week	-
Paranna et al., 2017	16 days/female	2 lower natal incisors	Tongue ventral surface	Extraction	10 days	YES
Jamani et al., 2018	1 months/female	1 neonatal lower incisor	Tongue ventral surface	Extraction	2 days	YES
Roman et al., 2018	7 months (lesion present for 5 months)/ Male	2 neonatal lower incisors	Sublingual area	Extraction/ excisional biopsy	10 days	NO
Kumari et al., 2018	45 days / female	1 lower natal incisor	Tongue ventral surface	Extraction	3 weeks	-
Triches et al., 2018	15 days/ male	2 lower natal incisors	Tongue ventral surface	Extraction	-	-
Polat Ekinci et al., 2018	14 months (lesion present for 11 months)/ Male	2 neonatal lower incisors	Tongue ventral surface	Extraction/ excisional biopsy	14 days	NO
Daraz et al., 2019	1 day/ male	2 lower natal incisors	Sublingual area	Extraction	-	YES
Karija et al., 2019	15 days /female	2 lower natal incisors	Tongue ventral surface	Extraction	30 days	YES
Biradar et al., 2021 (case1)	2 weeks/Male	1 neonatal lower incisor	Sublingual area	Extraction/ Benzocaine topic	5 days	YES
Biradar et al., 2021 (case 2)	5 weeks/ Male	1 neonatal lower incisor	Tongue ventral surface	Extraction/ Benzocaine topic	5 days	YES
Singh et al., 2021	10 days/ Female	2 natal lower incisors	Tongue ventral surface	Extraction	10 days	NO

TABLE 1 Clinical case results included in the review.

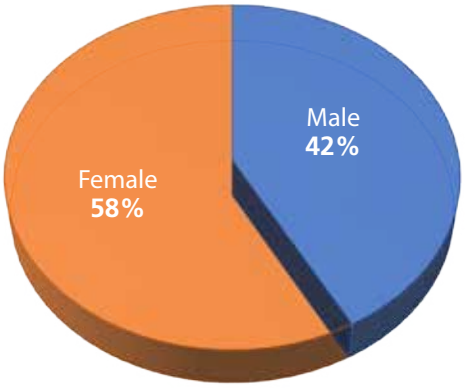


FIG. 2 Gender distribution.

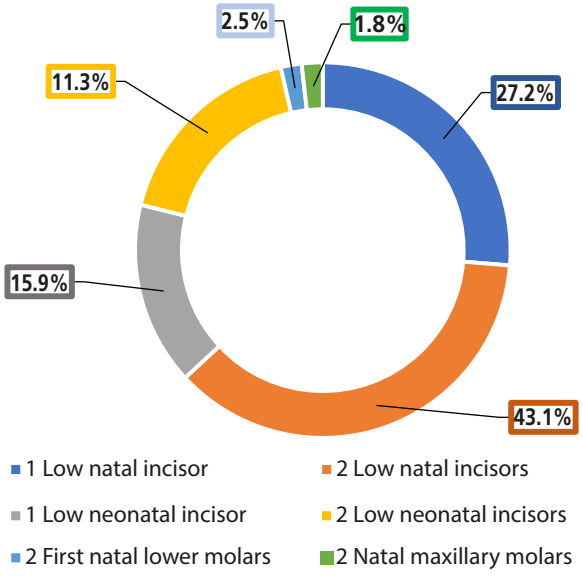


FIG. 3 Distribution of teth.

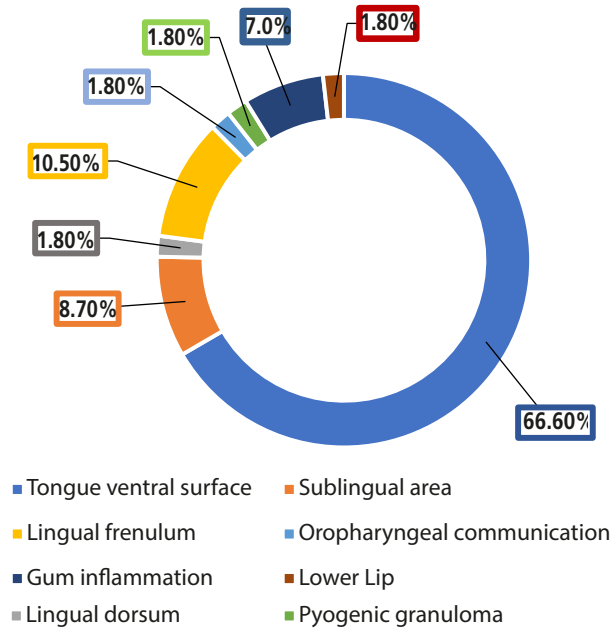


FIG. 4 Distribution of sites of lesions.

The degree of mobility of the natal / neonatal teeth was reported in 43 cases. Dental mobility was present in 31 cases (72.1%) while 12 cases showed non-mobile teeth (27.9%). Twenty-nine of the 31 cases presenting teeth with mobility were treated with extraction procedures (93.5%) and the remaining 2 with ameloplasty (6.5%) (Fig. 7). Five of the 12 cases in which tooth mobility was absent were treated extractive (41.6%), 3 with ameloplasty (25%), 2 with composite restorations (16.7%) and the last 2 with occlusal plate (16.7%). (Fig. 8). Healing times, understood as the days elapsed from treatment to clinical remission of the lesion, ranged from a minimum of 2 days to a maximum of 3 months with an average time of 20 days. No statistically significant correlation was observed between age, type of treatment and healing time.

Case reports

Two case reports treated by the authors and never previously reported in the literature are described in the present work.

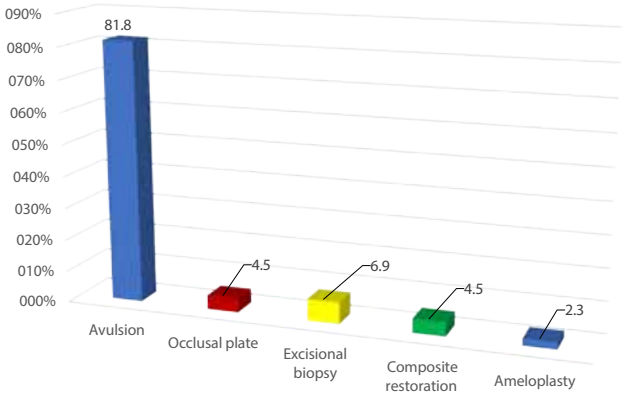


FIG. 5 Treatments.

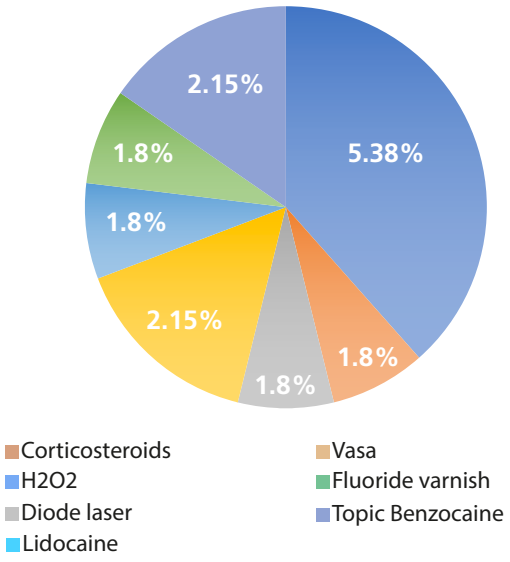


FIG. 6 Combined treatments.

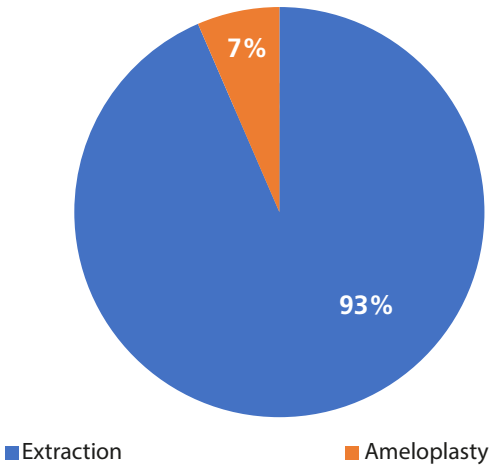


FIG. 7 Treatment of cases with dental mobility.

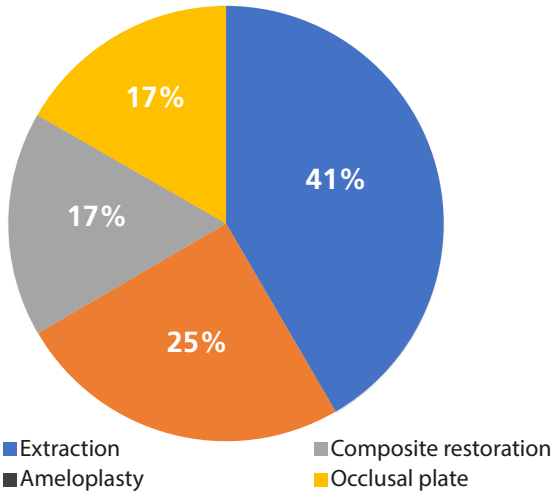


FIG. 8 Treatment of cases without dental mobility.

Case 1

An outpatient dental consultation was requested for a 3-day-old girl, admitted to the Paediatric unit of the University Hospital "San Giovanni Di Dio and Ruggi D'Aragona" in Salerno, Italy, for a dental evaluation of a lesion on the ventral surface of the tongue. From the physical examination, the lesion of the tongue appeared as a circular ulcerated surface of about 9 mm. During the examination, the presence of two lower central incisors was also highlighted, with grade 2 mobility. Based anamnestic data collected and the physical examination, the diagnosis of RFD was made. Then we moved to the treatment plan with extraction of the two teeth, in order to favour the healing of the lesion and avert the risk of inhalation or ingestion following spontaneous exfoliation. The natal teeth were extracted, with parents' consent, and curettage of the socket was performed. The extracted teeth showed the absence of roots, an opaque whitish colour, the right tooth had a noticeable lower crown development compared to the left one. The crown of the two incisors measured about 4 mm mesio-distally. No stitches were required and complete healing of the wound occurred in approximately 14 days (Fig. 9-14).







FIG. 9 Case 1 before treatment: clinical presentation of Riga-Fede disease. FIG. 10 Presence of two lower central incisors. FIG. 11 Ulcerative lesion of the tongue.







FIG. 12 Case 1 after treatment: teeth evaluation. FIG. 13, 14 The oral cavity after extraction of the neonatal teeth.

Case 2

A 14-day-old female patient was presented to our observation. In the medical history, the mother reported a difficulty on the part of the child in breastfeeding. The intraoral clinical examination revealed the presence of a neonatal tooth, a lower central incisor with grade 2 mobility. Adjacent to the tooth, an exophytic lesion of about 4 mm was observed at the level of the keratinised gingiva that covers the alveolar process in the pre-eruptive period. In the sublingual area, a whitish lesion of about 4 mm near the tooth was observed. Based on the data collected from anamnestic and clinical evaluation, the diagnosis of RFD was made. Due to the grade 2 mobility and the young age of the patient, we opted for extractive treatment of the neonatal tooth and surgical removal of the exophytic gingival lesion. The tooth was extracted in order to improve the ability to suck and nourish, to promote healing of the sublingual lesion and to avoid the risk of spontaneous exfoliation with the subsequent risk of inhalation or ingestion of the tooth. The extracted neonatal tooth had a normal-shaped crown but with underdeveloped mineralised tissue, and the absence of the root. At the 10-day post-operative visit, complete healing of the sublingual lesion was observed and an improvement in nutritional functions was reported by the mother (Fig. 15–18).

Discussion

RFD is a benign pathological condition characterised by the presence of ulcers affecting the child's oral mucosa [Senanayake and Karunaratne, 2014] due to the traumatic action of the sharp incisal edges of the natal/neonatal teeth [Costacurta et al., 2012]. The area most frequently affected by ulcerative lesions is the anterior ventral surface of the tongue, which is affected in 68.1% of cases [Costacurta et al., 2012; Volpato et al., 2015]. Less frequently affected areas are the lingual frenulum [Hedge, 2005] in 11.3% of cases, the sublingual area [Jariwala et al., 2008] in 6.8% of cases, the palate and gums [Anegundi et al., 2002]. From the histological point of view, RFD is characterised by areas of ulcerated mucosa with granulation tissue and mixed inflammatory infiltrate with presence of lymphocytes, mast cells, macrophages and a high number of eosinophils [van der Meij et al., 2012]. Symptoms may be absent [Parisay et al., 2013] or painful with the little patient showing irritability [Sharma et al., 2012; van der Meij et al., 2012]. Various therapeutic approaches have been described in the literature: in the 1900s Eichenfield et al. [1990] performed the surgical excision of the ulcers associated with RFD, a technique that was more recently revived by van der Meij et al. [2012]. The use of bites, in order to avoid the traumatic action of the teeth, was proposed by Baldiwala and Nayak [2014] even if there are numerous limits due to the patient's age for the use of plates. The use of topical corticosteroids, in order to reduce the inflammatory component, on the other hand, has been proposed by other authors [Choi et al., 2009; Moreira and Goncalves, 2010; Basavraju et al., 2015; Da Silva et al., 2017]. Among these authors, Moreira and Goncalves [2010] evaluated the possible use in association with Vasa extract, an acanthaceae plant with known anti-inflammatory properties [Bifulco et al., 2016]; Da Silva [2017] proposed the use of low-power diode lasers to reduce the inflammation and speed up healing: diode and Erbium:Yag lasers are already employed for their advantages in paediatric patients for surgical excision of lesions of the oral mucosa and for caries removal [Pisano et al., 2021; Korniblit et al, 2008]. Finally, we mention Shetty et al. [2017] who, in order to reduce the painful component, proposed for the application of 2% lidocaine gel on the lesion after removal of the irritative stimulus.

It should be emphasised that the treatments listed above reduce the patient's symptoms without complete resolution of the pathology due to the persistence of the injurious stimulus in the oral cavity. Although valid, therefore, for the purposes of a complete resolution of the lesion and associated complications, the extraction of the natal/neonatal teeth [Daraz et al., 2019; Graillon et al., 2013; Mathew et









FIG. 15 Case 2 before treatment: the patient 14-day-old.
FIG. 16 Clinical presentation of the lower central neonatal incisor associated with an exophytic lesion.
FIG. 17 Case 2 after treatment: evaluation of the tooth.
FIG. 18 Presentation of oral cavity after avulsion of the neonatal tooth.

al., 2010], ameloplasty of the incisal margins [Moreira and Goncalves, 2010; Basavraju et al., 2015] and additive restoration with adhesive materials [Volpato et al., 2015; Deep et al., 2011] should be considered.

The mobility of the natal/neonatal teeth is an important factor for treatment planning as this represents, if present, a risk factor for the patient's health. In fact, teeth with mobility can be ingested or, even worse, inhaled during lactation or due to spontaneous exfoliation [Dunlop et al., 2013]. From the data found in literature, in case of mobility often clinicians prefer extraction to avoid the possible ingestion and inhalation of the teeth. In the two cases presented, in which the patients showed a grade 2 mobility of the teeth, the therapeutic choice fell on the extraction procedure precisely because of these considerations.

The maintenance of the natal and neonatal teeth in the dental arch remains however the main aim, because the premature loss of these teeth, which in 90–99% of cases belong to the deciduous series [Rao and Mathad, 2009], can lead to a loss of space resulting from an altered development of the arches and therefore predispose to malocclusion [Jingarwar et al., 2014].

This therapeutic choice has the great advantage of being decisive and quick to execute but, at the same time, it has the disadvantage of causing the loss of deciduous teeth except in cases where the natal/neonatal teeth are supernumerary [Dunlop et al., 2013; Danelon et al., 2017; Kanumuri, 2017].

A consideration to be made before extraction is the lack of vitamin K in the neonatal period. Vitamin K is an essential enzymatic co-factor for the action of certain vitamin K-dependent clotting factors [Wang et al., 2017; Jiland et al., 2008]. This deficiency can be explained from a biological point of view as vitamin K has a very poor placental passage and the endogenous synthesis by the child begins with the proliferation of intestinal bacterial flora which, in the newborn, is absent. The deficit generally lasts until the fourteenth week of life [Jiland et al., 2008]. The WHO guidelines [WHO Reproductive Health Library, 2018] of 2018 suggested the preventive administration, immediately after child delivery, of an intramuscular injection of 1 mg of vitamin K to prevent spontaneous bleeding [Jiland et al., 2008]. In Italy, the first dose of 1 mg is administered via intramuscular injection at birth, followed by doses of 2 mg, once a week, for 6-8 weeks. Given the above, it is therefore advisable to perform the extraction of natal/neonatal teeth when the newborn is at least 10 days old, with a prophylactic administration of 0.5/1 mg of vitamin K IM both before and after extraction [Wang et al., 2017; Jiland et al., 2008; Witt et al., 2016].

RFD can be managed in some cases without extraction [Kana et al., 2013]. Ameloplasty of natal teeth it is a conservative choice as the teeth are kept in the mouth [Nogueira et al., 2014; Choi et al., 2009]. It is preferable to opt for this treatment when the pain does not affect the child's ability to feed and in cases where the mobility of the teeth is moderate and not likely to cause spontaneous exfoliation [Moreira and Goncalves, 2010; Basavraju, 2015]. Dental mobility must be taken into consideration as, even if minimal, it can be the cause of spontaneous avulsion [Choi et al., 2009; Moreira and Goncalves, 2010]. Ameloplasty entails shaping of the sharp incisal margins and involves the use of a bur mounted on a 1: 5 multiplier handpiece. This instrument is preferred to the turbine for the good and rapid cutting efficiency on the enamel even with a limited number of revolutions, avoiding refrigeration with water spray, as well as minimising the risk of accidental mucous lesions attributable to sudden movements of the patient. The treated surfaces can then be subsequently polished with silicone rubber pads. The follow-up evaluation takes place approximately 7–10 days after treatment [Uzamis et al., 1999; Nogueira et al., 2014; Basavraju et al., 2015].

Following the incisal remodeling of the teeth, the additive restoration involves the use of composite material [Deep et al., 2011], or glass ionomer cement [Volpato et al., 2015]. It is a very conservative treatment but, because of inadequate enamel surface area for resin bonding combined with the difficulties of field control, adequate retention of the resin could be diffisult to achieve. Should the restoration fail, the composite resin could also be swallowed or inhaled, and this could lead to forensic issues, therefore some authors recommend photographic documentation [Di Lorenzo et al., 2015].

Conclusions

The choice of the treatment should be made on a case-by-case basis. Based on this review, it can be stated that the treatments of choice for natal/neonatal teeth are surgical avulsion and ameloplasty. In case of high dental mobility, resulting in an increased risk of exfoliation and possible ingestion/inhalation of the teeth, extraction is the therapeutic route of choice. When nutrition is not compromised, ameloplasty represents the treatment of choice, as it is less invasive and more conservative.

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