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Prolonged retention of deciduous teeth, prematurity, and low birth weight: Report clinical case

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ABSTRACT
Prolonged retention of primary teeth may indicate an alteration in the physiological resorption process of these teeth. Several factors can influence the root resorption of primary teeth and consequently alter the proper irruption of successor permanent teeth. Prematurity and low birth weight are systemic factors that seem to be causes of the delay in eruption in the irruption of permanent teeth. The objective of this article was to present a clinical case of prolonged retention of primary teeth and delayed eruption of permanent teeth in an 8-year-old patient with a history of prematurity and low birth weight; the consequences of the delay in the irruption and the proposed treatment. The approach involved anamnesis, clinical examination, complementary radiographic examinations (periapical and panoramic) and then the surgical interventions were scheduled, divided into two clinical sessions of tooth extractions of the dental elements that hindered the irruption of the successor permanent elements; Initially elements 52 and 62 and then teeth 73 and 83. It was concluded that the timely evaluation of the retention of the deciduous teeth and the delay in the eruption of the successor permanent teeth was important for the treatment decision in a preterm patient with low birth weight, making the surgical intervention appropriate to hinder the slow eruption and/or impaction of the successor permanent teeth and to avoid damage to the patient's occlusion. reducing the future need for invasive corrective treatment, while also considering the need to monitor the clinical progress of the case.

Keywords: Primary tooth, Denture Retention, Pediatric dentistry.

1 INTRODUCTION

Physiological tooth resorption is a natural phenomenon, programmed by the body and essential for the exfoliation of primary teeth and subsequent eruption of permanent successors [1,2]. In this process, the deciduous teeth undergo gradual resorption and concomitant with the eruption of the successor permanent teeth3,4. This feature occurs intermittently, with periods of resorption, remodeling and neoformation of tooth structures5, which are directly related to the positioning of the germ of the permanent successor tooth1.

However, if the root resorption of the deciduous teeth does not occur uniformly and

adequately, it can cause prolonged retention of these elements, with a consequent delay in the eruption of the successor teeth [6,7,8]. Prolonged retention of deciduous teeth is considered when these teeth remain in the oral cavity, prevailing over the normal chronology of their exfoliation for a time of more than six months8.

Prematurity and low birth weight are considered factors related to possible causes for the delay in tooth irruption of deciduous teeth, impairing the eruption of permanent teeth, determining a general delay in development9,6. However, there is no agreement among the researchers, who consider that when correcting age for prematurity, the delay in the eruption of deciduous is not observed [10,11,12].

In any case, prematurity and low birth weight are conditions that affect the development of oral and dental structures, such as the delay in the chronology of tooth irruption and should be carefully studied so that children can receive special attention from the dentist, with an appropriate clinical approach, in order to lead the permanent successor tooth to a safe irruption, ensuring better occlusion and aesthetics during the biological cycle in the oral cavity.

From this perspective, this study aimed to present a clinical case report of prolonged retention of primary teeth and delayed eruption of permanent teeth in a patient with a history of prematurity and low birth weight; the consequences of the delay in the irruption and the proposed treatment.

2 METHODOLOGY

This is a short, descriptive study that aims to present a clinical case report, infrequently in the dental clinic, which corresponds to the prolonged retention of deciduous teeth. Initially, the patient was treated for data collection through anamnesis, clinical and physical examination, in addition to photographic records and requests for complementary exams such as panoramic radiography. The consultations were carried out at the school clinic of the Federal University of Maranhão, in the discipline of integrated children's clinic. The guardian was informed that there would be no costs for the treatment and the name of the minor was kept confidential, according to the Free and Informed Consent Form (ICF)

2.1 CASE REPORT

In November 2021, a female patient, leukoderma, 8 years old, with no other disease, attended the Integrated Children's Clinic of the Federal University of Maranhão accompanied by her guardian, complaining of non-softening of the primary teeth. In the anamnesis, it was reported that the child was born prematurely at 32 weeks through a cesarean section indicated due to Pregnancy-Specific Hypertensive Disease (HDP) + fetal centralization. She was born weighing 1,600 grams and measuring 42cm, she was a patient in the Intensive Care Unit (ICU), followed by an Intermediate

Nursery (BI) until she arrived at the Rooming-in Unit (ALCON) for 18 days. Initial feeding was Pasteurized Human Milk (LHP) and Breast Milk (LM) and later being exclusively fed LM until 3 months old, being discharged with 1,780 grams and measuring 43.5 cm.

It was also reported that the patient did not present any malformation or any other complication, and intubation or resuscitation was not necessary during her hospitalization. Regarding speech, cognitive, motor, and neurological development, the child did not present any delay, and his development curve normalized at two years of age.

About feeding, it was informed that up to 3 months of life, only breast milk was offered on demand, after which formula was added as a complement. After 5 months, he started to introduce food with vegetable juice and soup, and at the age of one and a half he was already eating solid food. It is noteworthy that the child was followed by a multidisciplinary team (occupational therapist, speech therapist, neurologist, pediatrician, ophthalmologist) from the ICU until he was two years old, when he was discharged. It does not ingest soft drinks and has their diet monitored by nutritionists and pediatrician, not making abusive consumption of added sugars.

Regarding dentition, it was reported that the patient had the eruption of the first deciduous tooth at 10 months, and the eruption of the other teeth normally followed according to the appropriate chronology for deciduous teeth. However, regarding the replacement of the deciduous dentition with the permanent one, it was reported that since the first tooth there was never complete softening (total root resorption), requiring in-office extractions of dental elements 51, 61, 71, 72, 81 and 82, due to the ectopic eruption of the permanent teeth of the teeth in question (Figures 1 and 2).

Figure 1. Initial image of irruption of teeth 31 and 41 by lingual

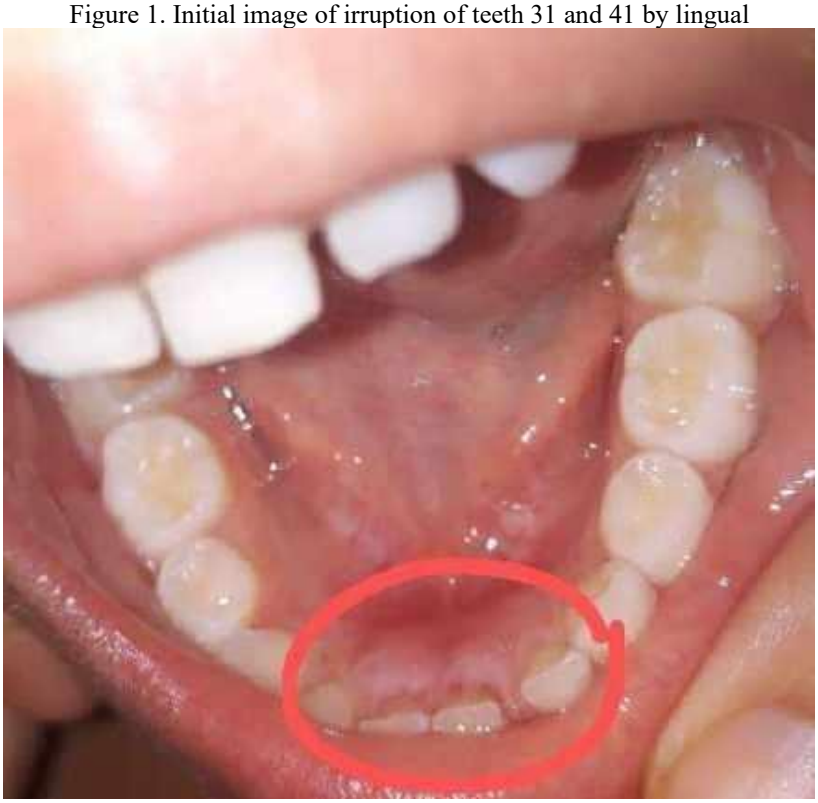


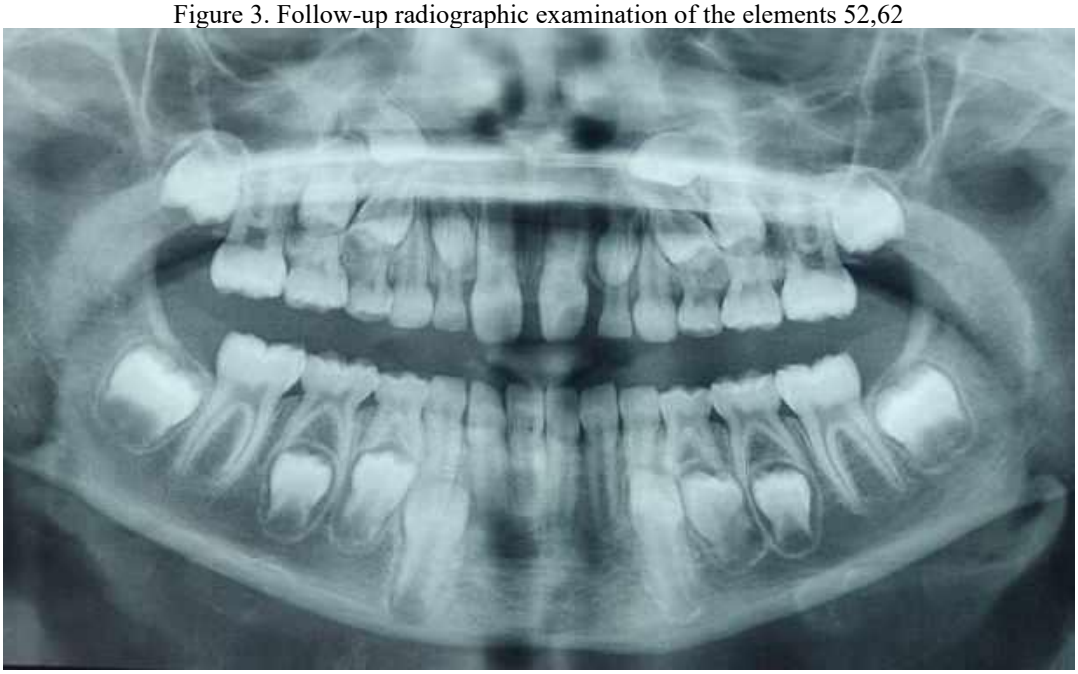
Figure 2. Image of tooth 32 eruption by lingual.

The initial photographs (figures 1 and 2) were obtained from the family. Figure 1 shows the ectopic eruption of mandibular central incisors 31 and 41 by lingual eruption of deciduous incisors 71 and 81. And in figure 2, the eruption of the lower lateral 72 behind the deciduous lateral, which already demonstrates the early alteration in the resorption and tooth eruption of the successor even with the deciduous still in the arch.

During the clinical examination in the office, it was observed that the patient had mixed dentition in clinical health conditions, that is, without signs of caries disease or periodontal disease, free of caries. In the upper arch, diastemas were observed in the central incisors and in the lower arch, crowding of the teeth 31,32,41 and 42. Complementary radiographic examinations (periapical and panoramic) were requested to confirm the diagnosis (Figure 3).

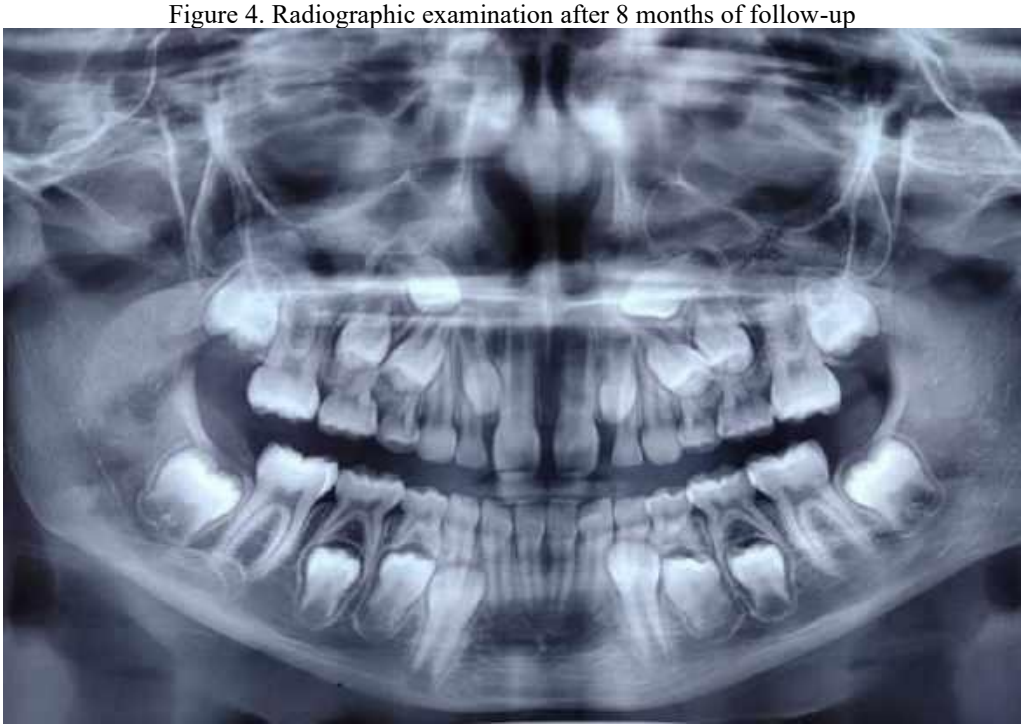
The patient is cognitive, healthy and this alteration was not associated with any syndrome or family history, being the first to present this condition of retention of deciduous teeth.

Figure 3. Follow-up radiographic examination of the elements 52,62



The panoramic radiography revealed mixed dentition, the germs of successor elements 33 and 43 were in a vertical intraosseous position, being in the 8th stage, with practically 2/3 of its root formed, with no reabsorption of the roots of the predecessor elements. The suspicion of the distance between the apex of the roots of the deciduous teeth in relation to the dental germ of the successors as a factor responsible for the irregular resorption was ruled out (Figure 3).

Figure 4. Radiographic examination after 8 months of follow-up



After 8 months of follow-up, a new panoramic radiographic examination was performed, which determined the diagnosis of prolonged retention of teeth 52, 62, 73 and 83. The dental germs

of the successor teeth were in an intraosseous vertical position, and the successor dental elements 12 and 22 were in Nolla stage 7, with practically 1/3 of their root formed; and elements 33 and 43 lying in the 9th stage of Nolla, with their roots almost complete at an open apex. The irregular resorption of the roots of its predecessors is notorious, presenting no physical obstructions for tooth irruption. Thus, tooth extractions of dental elements 52, 62, 73 and 83 were indicated, and the surgical interventions were divided into two clinical sessions; initially elements 52 and 62 and then teeth 73 and 83 (Figure 4).

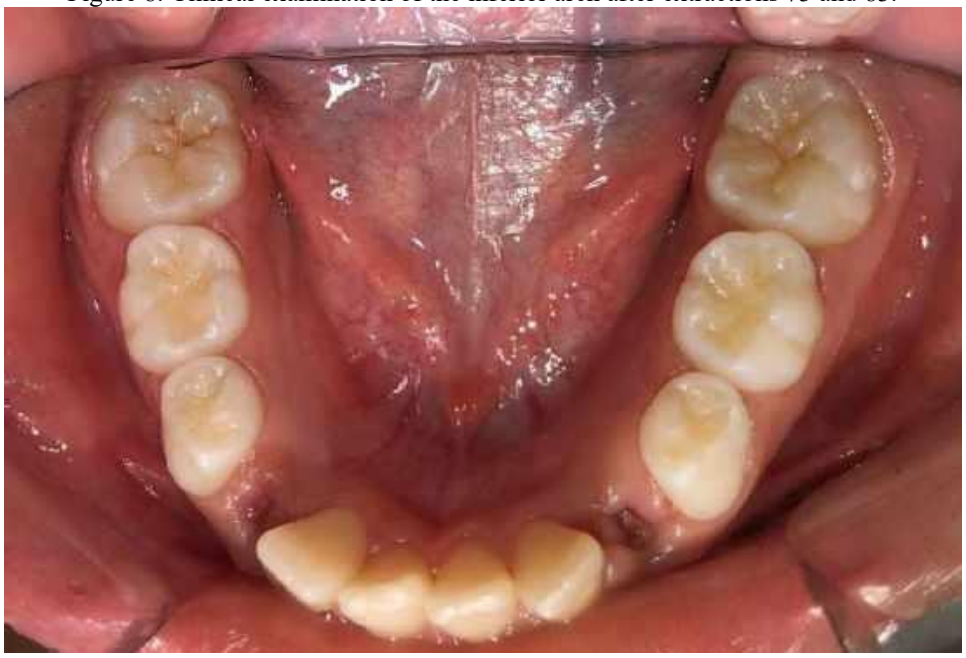
Figure 5. Image of extracted elements

Figure 5 shows irregular root resorption, where less and less resorption can be observed as the patient grows, and it is possible to prove the complete lack of root resorption in the dental elements 52, 62, 83. Characterizing a systemic condition of the patient, since this alteration occurred in all teeth extracted until then.

Figure 6. Intraoral clinical examination in occlusion after tooth extractions 52,62,73 and 83

Figure 7. Intraoral clinical examination of the upper arch after extractions 52 and 62.

Figure 8. Clinical examination of the inferior arch after extractions 73 and 83.



Images 6, 7 and 8 were performed 15 days after the tooth extractions, for follow-up and registration of the case. Since the patient does not have any syndrome to justify this alteration. Prematurity and low birth weight were pointed out as a justification for this condition, since she was born at 32 weeks and weighed 1,600 grams.

Figure 6. Follow-up radiographic examination 5 months after tooth extractions.

In image 6, the follow-up X-ray after 5 months of tooth extractions, the irruptions of elements 12, 22, and 33 follow appropriately and gradually. It is also possible to observe the impaction of dental elements 43, 13 and 23; the conoid anatomy of elements 12 and 22, and gyroverted position of the dental element 34.

3 DISCUSSION

Prolonged retention of primary teeth can be determined by several factors, whether genetic, systemic, or local [6,13,14,15]. In the clinical case presented in this study, systemic factors related to prematurity, in which the caregiver reported the patient's birth in the 32nd gestational week; and low birth weight, with 1,600 grams, seemed to have contributed to prolonged retention, considering that there are no similar cases in the family and the patient has not presented, so far, any other alteration that would justify this condition.

Clinical examination associated with periapical, occlusal and panoramic radiographs can help in the discovery of possible etiological agents related to the absence of tooth eruption9,14,16. Radiographic examination allows the identification of factors that may mask the diagnosis and even contraindicate the procedure, such as a bone layer covering the dental crown, agenesis, and degree of root formation, which is decisive for a correct diagnosis16. In this sense, situations of dental agenesis and delayed tooth irruption seem to present similar signs, such as the absence of permanent teeth in the oral cavity1,2,17 Therefore, it is important to perform a differential diagnosis in order to establish the best form of treatment9,15.

In the clinical case presented in our study, clinical and complementary radiographic examinations with panoramic images were performed in order to confirm the diagnosis of

prolonged retention and rule out the possibility of dental agenesis, however, we observed that teeth 12, 22, 33 and 43 were present at the intraosseous level and we did not find any clinical alterations that could prevent root resorption of dental elements 52,62,73 and 83. The dental germs of the successor teeth were in an intraosseous vertical position, and the successor dental elements 12 and 22 were in Nolla stage 7, with practically 1/3 of their root formed; and elements 33 and 43 lying in the 9th stage of Nolla, with their almost complete roots and open apexes. On the other hand, deciduous dental elements 52, 62, 73 and 83 showed almost no root resorption (Figures 4 and 5).

The treatment reported for cases of prolonged retention of deciduous teeth has been surgical intervention with follow-up depending on the age at which the treatment was initiated, the period of development in which the patient is and the consequences observed [6,14,18]. The patient in the clinical case under analysis was 8 years old and had as consequences ectopic eruption of mandibular incisors 31, 41, 32 and 42, and impaction of canines 33 and 43. This case was treated with surgery to remove dental elements 52,62,73 and 83, and follow-up.

For a physiologically adequate occlusion, it is important that the irruption chronology is respected in all its phases and stages. When there is an absence or delay in the eruption of a tooth element, the cause should be carefully sought to correctly plan the time and type of treatment to be adopted6,14,15,18. In the clinical case presented here, we did not find the absence of a successor, but rather a delay with ectopic eruption of the mandibular incisors.

During the eruption of the permanent tooth, the alveolar bone and the roots of the primary teeth are resorbed to a greater extent than necessary for the irruptive movement of the tooth. This excess resorption is repaired by new bone and cementum formation in the resting [period1,2,19]. Although the rest periods are longer, resorption predominates and the end result is the exfoliation of the primary tooth. Permanent teeth only erupt when the roots of the deciduous teeth are adequately resorbed [2,14,20]. This is because normal root resorption guides the irruption of the [successor.14,21.]However, this orientation regarding root resorption was not observed in the clinical case presented, as he had a dental history of incomplete root resorption since the irruption of the first permanent successor tooth.

Prolonged retention of deciduous teeth alters the normal irruption pathway of successor teeth, resulting in impaction, ectopic irruption21,22, root resorption of adjacent teeth, cystic formation, development of caries, and periodontal disease. This condition can be diagnosed early, as long as the sequence of irruption of successors is periodically and radiographically monitored14,21. It was observed that the patient was in good oral health throughout her life, had no previous history of dental caries or periodontal disease or even at the time of the evaluation for the study, but there were changes in the bite caused by ectopic eruptions of dental elements 41, 31, 42 and 32 (Figures 1 and 2).

Prematurity and low birth weight have been described as causes for delayed tooth eruption of

primary teeth and consequent delay in replacing them with permanent successors, in addition to the appearance of enamel defects, ranging from color changes to more severe damage, such as dental agenesis [6,23,24]. Premature infants and those with low birth weight have a higher risk of enamel defects6,9,24. The patient in our study was born weighing 1,600 grams, which is well below the weight considered adequate for a newborn, and this condition may have influenced the delay of the eruption and consequent prolonged retention of the primary teeth.

The preterm infant often has a respiratory deficiency, requiring mechanical ventilation through nasotracheal or orotracheal tubes. Nevertheless, orotracheal intubation and laryngoscopy can cause damage to the larynx, cause subglottic cysts, bronchial stenosis, as well as cleft palates, alveolar grooves, laceration of primary teeth, crossbites, open bites, speech problems, and enamel hypoplasia6,9,25. There are records in the literature of hypoplasia and hypocalcification in premature and low birth weight children in both dentitions, the incidence of which varies between 66 and 96% [26,27,28]. During anamnesis, it was reported by the person in charge that the patient did not need mechanical ventilation to breathe, and that she remained in the ICU/BI/ALCON only due to low weight. It is probable that this fact may have contributed to the fact that we did not identify any enamel defects or hypoplastic alterations

Low birth weight can be a consequence of premature birth, size for gestational age, or both, but its etiology is multifactorial and this condition can cause changes in the development of oral structures, respiratory, infectious, cardiovascular, gastrointestinal, sensory, neurological diseases, metabolic dysfunction, and problems in the growth and development of the child throughout life17, 23,29. Contrary to what has been exposed, the case presented in this report did not report any chronic, inflammatory or infectious diseases, only changes in the development of oral structures related to prolonged retention of deciduous dental elements and ectopic irruption of permanent teeth.

One factor that contributes to a desirable oral condition is to maintain a balanced diet after the breastfeeding period, since deficiency states or the ingestion of specific food groups can influence odontogenesis, tooth eruption and the development of caries30,31,32. And these nutritional changes can lead to structural changes in the dental tissues, which can cause anomalies in the position and eruption time of these dental organs33,34,35. Data on the patient's diet revealed the care and the profile free of caries and periodontal disease.

The present study had some limitations, such as the fact that it presents few current articles on this topic available online for free and complete. It is essential that new studies be carried out to deepen the discussion on the subject. However, this case report sought to contribute to the correct diagnosis and appropriate indication of the procedure to be performed in situations of prolonged retention of deciduous teeth and ectopic irruption of permanent teeth in patients with a history of prematurity and low weight. It is important to instruct parents or guardians and health professionals,

such as doctors and dentists, about possible delays in tooth irruption, avoiding future damage in the development of inadequate occlusion, which can lead to functional limitations and psychosocial problems, since it directly influences the person's aesthetics.

4 CONCLUSION

Based on the clinical case exposed, it is concluded that:

- Prolonged retention of primary teeth, delayed eruption or ectopic irruption of successor permanent teeth may be behind systemic conditions such as prematurity and low birth weight.
- Early surgical intervention can minimize damage or avoid major consequences to the patient's occlusion, which may reduce the future need for invasive corrective treatment, also considering the need to monitor the clinical progress of the case.

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