An Unusual Case of Severe Primary Molar Infraocclusion

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ABSTRACT

Dentoalveolar ankylosis is described as the direct union between root cementum/dentin and alveolar bone. Its etiology is unknown, and conflicting opinions have been presented to explain it. Late detection of ankylosed primary teeth may cause serious problems to the occlusion and generally demands a more complex treatment approach. The purpose of this report is to present an unusual case of severe infraocclusion of the primary maxillary right second molar associated with a posterior crossbite in a 6-year-old child. The initial treatment option was tooth extraction, but the tooth resumed eruption spontaneously. After correction of the posterior crossbite and a 1-year follow-up, the tooth remained in occlusion and the permanent successor was developing without problems. From this unusual outcome, it may be concluded that further investigation of this anomaly of eruption is needed. (J Dent Child 2013;80(2):88-91)

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KEYWORDS: TOOTH ANKYLOSIS, PRIMARY TEETH, TOOTH RESORPTION, TOOTH EXTRACTION

Dentoalveolar ankylosis is an anomaly characterized by the anatomical union between the root surface (cementum and/or dentin) and the alveolar bone.[1] It results from a replacement resorption process in which the root structure is progressively replaced by bony tissue. It may occur during tooth eruption, while the tooth is in occlusion, or even during the process of physiological root resorption.[1]

Although its etiology remains unclear, several factors are believed to be related to the development of ankylosis, including genetic predisposition,[1-4] local metabolism disturbance causing the loss of the periodontal membrane,[5] traumatic occlusion or mechanical trauma that may cause periodontal ligament rupture,[3,6,7] and congenital absence of the succeedaneous permanent teeth.[5,8]

The prevalence of dentoalveolar ankylosis ranges from 1% to 44%,[2,9,10] and there is no gender predilection.[10] The primary dentition and the mandibular arch are predominantly affected.[5,10] A consensus has not yet been reached, however, regarding the most commonly affected tooth. While some authors[3,10] report that the primary mandibular first molar is most often involved, others[2,11] state that it is the primary mandibular second molar.

Brearley and McKibben[9] proposed a classification according to the severity of submersion:

1. Mild: when the occlusal surface of the affected tooth is 1 mm from the occlusal plane established by the nonankylosed adjacent teeth;

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2. Moderate: when the occlusal surface of the affected tooth is located at the same level as that of the interproximal contacts of the nonankylosed adjacent teeth;
3. Severe: when the occlusal surface of the affected tooth is located at the gingival level or is completely submerged.

The treatment plan for ankylosed teeth is determined by the level of submersion, patient's age, and severity of the case.[12-15]

The purpose of this report is to present an unusual case of severe infraocclusion of a primary maxillary right second molar associated with a posterior crossbite in which unexpected continued eruption of the submerged tooth occurred without any treatment.

CASE REPORT

A 6-year old female was brought to the Pediatric Dentistry Clinic at the School of Pharmacy, Dentistry and Nursing, Federal University of Ceará, Fortaleza, Brazil, with the main complaint of "disappearance of a baby tooth." The intraoral clinical examination revealed that the primary maxillary right second molar was in severe infraocclusion and the permanent maxillary right first molar was slightly mesially tipped (Figure 1). A unilateral posterior crossbite was also observed on the right side. A metallic sound characteristic of ankylosed teeth could be detected during the percussion test.

A periapical radiograph confirmed that the primary tooth was submerged, but the radiographic findings were not conclusive because the space corresponding to the periodontal ligament could be clearly seen in some areas of the root surface, while it was hardly visible in other areas (Figure 2). The panoramic radiograph confirmed the presence of all permanent successors.

The patient was in the mixed dentition stage and had a skeletal Class I malocclusion with a Class I primary canine relationship. According to the patient's mother, the only dental treatment she had received was an amalgam restoration on the occlusal surface of the infraoccluded tooth. Oral health was considered good, and her medical history was unremarkable.

The treatment of choice was surgical extraction of the infraoccluded tooth, followed by a space maintainer and a palatal expander to correct the posterior crossbite. The patient missed the dental appointment, showing up again at the dental clinic 5 months later. A new intraoral clinical examination was performed and, surprisingly, the infraoccluded tooth was in the right position. According to the patient's mother, no treatment was done elsewhere since her last visit to the dental clinic. Clinical and radiographic monitoring was the approach of choice. Rapid maxillary expansion using a Haas expander was initiated to correct the posterior crossbite.

After a 1-year follow-up, the primary maxillary right second molar remained in occlusion and the corresponding premolar is following a normal course of development (Figure 3 and 4).

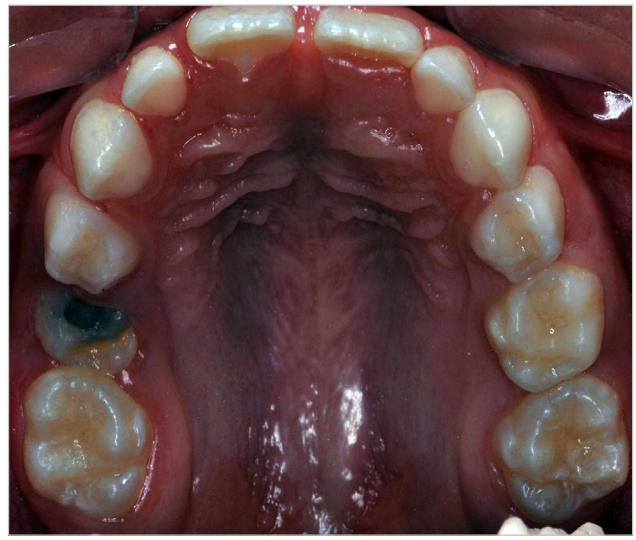

Figure 1. Primary maxillary right second molar in severe infraocclusion.

Figure 2. Initial periapical radiograph showing the infraoccluded primary second molar and the mesially tipped permanent first molar.

Figure 3. Clinical photograph after 12 months of follow-up showing the completed eruption of the primary maxillary right second molar in occlusion.

Figure 4. Periapical radiograph taken after 12 months of follow-up, showing the primary maxillary right second molar in occlusion and adequate development of the succeeding premolar.

DISCUSSION

The diagnosis of dentoalveolar ankylosis is based on clinical and radiographic findings, and may be confirmed by histological examination.[3] The clinical signs include infraocclusion, emission of an acute loud metallic sound to percussion, and lack of mobility. The results of percussion and mobility tests are considered different from normal conditions only when 20% and 10% of the root, respectively, is fused to the alveolar bone.[1,14] Radiographically, loss of continuity of the periodontal ligament space is observed, and the root and alveolar bone appear to be fused with undistinguishable limits in the ankylosed area.[1,14] Nevertheless, areas of ankylosis are not always identified because of superpositioning of mineralized structures.

The diagnosis of ankylosis on the buccal and lingual/palatal surfaces is difficult due to the 2-dimensional nature of radiographic images. Ankylosis frequently occurs in the furcation region, which makes it hard to detect radiographically.[1,5] The histological analysis also shows areas of root resorption repaired by calcified tissue, bone, or cementum, directly in contact with the cementum and/or dentin without the presence of a periodontal ligament.[1] In the present case, the diagnosis of severe ankylosis was made based on the clinical findings, since no radiographic findings suggestive of ankylosis were observed.

It has been suggested that there is a familial trend in cases of dentoalveolar ankylosis.[2,4] A study showed that the prevalence of ankylosed teeth was 44% and its occurrence among first-degree relatives was significantly higher than that observed among non-consanguineously related patients.[2] A statistically significant association has also been described between infraocclusion and the occurrence of tooth agenesis, microdontia of maxillary lateral incisors, palatally displaced canines, and distal angulation of the mandibular second premolars.[16] Neither family history of ankylosis nor association with dental anomalies was found in the present case.

It is generally accepted that the clinical management of dentoalveolar ankylosis should be done according to the severity of the infraocclusion. A tooth that presents mild to moderate ankylosis and is not close to exfoliation should not be extracted. Bi-annual clinical and radiographic examinations are indicated to check for physiological root resorption, degree of infraocclusion, and development of the succeeding permanent tooth.[8,9,14] In addition to that, building the height of the affected tooth to the occlusal plane with stainless steel or composite resin crowns can stimulate natural tooth exfoliation,[8,9,14] and prevent tipping of the adjacent teeth and overeruption of the opposing teeth.[13]

In severely submerged teeth, the treatment approach is extraction followed by removable orthodontic appliances designed for space maintenance until the eruption of the permanent sucessors.[4,8,13,14] Ponduri et al.[17] also reported an unusual outcome of infraoccluded teeth in which severely ankylosed molars "re-erupted" without the need of extraction.

In the present case, a possible hypothesis is that the ankylosed area was eliminated due to the start of the root resorption process. Furthermore, as there was no lack of space, the severely infraoccluded tooth "re-erupted" spontaneously without any kind of treatment. Another hypothesis could be related to the forces generated by the Hass expander,[18] stimulating the re-eruption process of the tooth in ankylosis.

If diagnosed early and properly followed, ankylosis of primary molars usually does not cause problems to the occlusion. However, in cases of late diagnosis and intervention, disturbances to the development of the dentition may occur, requiring surgical procedures and orthodontic therapy, which will increase the complexity, cost, and length of the treatment.[15,16] Severely infraoccluded teeth may present a challenge to the dentist. Although sometimes a conservative management is sufficient, in most cases surgical interventions are needed.[17]

The unusual outcome described in this report reinforces that there is a lot yet to be elucidated about the etiological factors and possible treatments of ankylosis in primary teeth.

REFERENCES

1. Hudson AP, Harris AM, Morkel JA, Amra I. Infraocclusion of primary molars: A review of the literature. SADJ 2007;62:114, 116, 118-22.
2. Via WF Jr. Submerged deciduous molars familial tendencies. J Am Dent Assoc 1964;69:127-9.
3. Henderson HZ. Ankylosis of primary molars: A clinical, radiographic, and histologic study. J Dent Child 1979;46:117-22.

4. Cozza P, Gatto R, Ballanti F, De Toffol L, Mucedero M. Case report: Severe infraocclusion ankylosis occurring in siblings. Eur J Paediatr Dent 2004; 5:174-8.
5. Biederman W. The incidence and etiology of tooth ankylosis. Am J Orthod 1956;42:921-6.
6. Atrizadeh F, Kennedy J, Zander H. Ankylosis of teeth following thermal injury. J Periodont Res 1971;6:159-67.
7. Mishra SK, Jindal MK, Singh RP, Stark TR, Hashmi GS. Submerged and impacted primary molars. Int J Clin Pediatr Dent 2010;3:211-3.
8. Albers DD. Ankylosis on teeth in the developing dentition. Quintessence Int 1986;17:303-8.
9. Brearley LJ, McKibben DH. Ankylosis of primary molar teeth. I. Prevalence and characteristics. J Dent Child 1973;40:54-63.
10. Aranha AMF, Duque C, Silva JYB, Carrara CFC, Costa B, Gomide MR. Tooth ankylosis in deciduous teeth of children with cleft lip and/or palate. Braz Oral Res 2004;18:329-32.
11. Ne RF, Witherspoon DE, Gutmann JL. Tooth resorption. Quintessence Int 1999;30:9-25.
12. Kennedy DB. Treatment strategies for ankylosed primary molars. Eur Arch Paediatr Dent 2009; 10:201-10.
13. Ekim SL, Hatibovic-Kofman S. A treatment decision-making model for infraoccluded primary molars. Int J Paediatr Dent 2001;11:340-6.
14. Kocadereli I, Turgut MD. Management of occlusal and developmental disturbances resulting from an ankylosed maxillary second primary molar: Case report. J Dent Child 2003;70:178-81.
15. Kjær I, Fink-Jensen M, Andreasen JO. Classification and sequelae of arrested eruption of primary molars. Int J Paediatr Dent 2008;18:11-7.
16. Shalish M, Peck S, Wasserstein A, Peck L. Increased occurrence of dental anomalies associated with infraocclusion of deciduous molars. Angle Orthod 2010;80:440-5.
17. Ponduri S, Birnie DJ, Sandy JR. Infraocclusion of secondary deciduous molars: An unusual outcome. J Orthod 2009;36:186-9.
18. Ladner PT, Muhl Z. Changes concurrent with orthodontic treatment when maxillary expansion is a primary goal. Am J Orthod Dentofacial Orthop 1995;108:184-93.