Management of permanent maxillary central incisor impacted by odontoma-like malformation: 48 months follow up

Manejo do incisivo central superior permanente impactado por odontoma: 48 meses de acompanhamento

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Abstract
This report describes management of delayed eruption of a central incisor caused by odontoma-like malformation. An 8-year-old girl was referred to pediatric dentistry clinic due to failure of the maxillary central incisor. Patient suffered a dental trauma at 36 months of age. Radiographic examination revealed an odontoma-like malformation. The odontomas were surgically removed. Since spontaneous eruption of the maxillary right central incisor did not occur during the subsequent twelve months after odontomas removal, surgery was carried out to expose tooth crown and to bond orthodontic button on the unerupted tooth to traction it. After 48 months, permanent central incisor presented signals of pulp vitality as well as the others adjacent teeth. Orthodontic management was successfully performed for correct alignment of central incisor impacted by odontoma-like malformations.

Key words: Odontoma; Traumatism; Orthodontic management; Children.

Resumo
Este relato descreve o manejo de um incisivo central com atraso de erupção causada por um odontoma. Uma menina de 8 anos de idade foi encaminhada devido à atraso na erupção mesmo após realização de ulotomia. Paciente sofreu um trauma aos 36 meses de idade. O exame radiográfico revelou a presença de odontoma que foram removidos cirurgicamente. Uma vez que não ocorreu a erupção espontânea do incisivo central superior direito durante os 12 meses subsequentes, foi realizada uma cirurgia para expor a coroa do dente e para colagem de um botão ortodôntico sobre o dente incluso para posterior tracionamento. Após 48 meses, o incisivo central superior permanente apresentava sinais de vitalidade pulpar, bem como outros dentes adjacentes. O manejo ortodôntico foi realizado com sucesso para o alinhamento correto do incisivo central impactado por um odontoma.

Palavras-chave: Odontoma; Traumatismo; Tratamento ortodôntico; Criança.
Introduction

An odontoma is a mixed tumor, known as hamartoma consisting of mineralized dental tissue malformations by ameloblasts and odontoblasts synthesis and differs from a true neoplasm. Among the lesions found in the anterior region, 56% of the cases are located in maxilla. Generally is an asymptomatic lesion that is usually found by chance and is often associated with the delayed eruption of permanent teeth.

Odontoma etiology is unknown, but it is believed that factors such as infections, genetic mutations and traumatisms are implicated. Traumatic injuries in primary dentition during the developmental stages of a succedaneous permanent tooth interfere with its future growth due to the close relationship between the apices of primary teeth and the buds of permanent teeth. Intrusion and avulsion are the most common trauma associated with development of permanent successors. Depending on the morphogenesis of tooth development, could develop a malformation tooth, such as enamel hypoplasia, root and crown dilacerations and less frequently, odontoma could occur.

The aim of this case report is to describe the management of odontoma-like malformation associated with permanent maxillary right central incisor and its 48 months follow-up.

Case Report

A 10-year-old Caucasian girl was referred to the Pediatric Dentistry Clinic of the Federal University of Rio de Janeiro in Brazil with a main complaint of lack of the permanent maxillary right central incisor. Her mother’s answers to anamnesis questions and revealed that at 36 months the patient suffered an intrusion of her primary maxillary right central incisor but did not receive any treatment. When she was eight years old, her primary maxillary right central incisor was over retained and it was removed. Since the succedaneous tooth did not erupt, an ulotomy was performed, but this procedure was ineffective. Consequently the child was referred to Pediatric Dentistry Clinic. Medical history gave no relevant information and the physical status classification was ASA I.

A clinical examination revealed a mixed dentition, absence of caries lesions, lack of the permanent maxillary right central incisor, and its space partially lost. Oclusal and periapical radiographic exams showed three radiopaque mineralized masses with unspecific shapes (Figure 1) similar to an odontoma-like malformation. Clark’s technique was used in order to identify the mal position, which located it in the vestibular region of the permanent maxillary right incisor. Thus, surgical removal of the odontoma was planned.
The odontoma-like malformation was surgically removed under local anesthesia (Lidocaine 2%, epinephrine 1:100.000, DFL, Rio de Janeiro, RJ, Brasil) and under conscious sedation due to patient non cooperative behavior, with nitrous oxide. For conscious sedation, firstly it was introduced 100% oxygen for 2 minutes followed by titration of nitrous oxide in 10% intervals. During nitrous oxide/oxygen analgesia, the concentration of nitrous oxide was 20%. When odontoma-like malformation was removed, nitrous oxide concentration was decreased until the nitrous oxide flow is terminated, thus 100% oxygen was delivered for 5 minutes.

Spontaneous eruption of the permanent maxillary right central incisor was expected during the subsequent four months; however radiographic images showed a slightly dilacerated root of the impacted tooth. Since eruption did not occur spontaneously, we carried out a second surgery to expose the tooth crown and to bond an orthodontic button on the unerupted tooth, using a light-cure orthodontic composite (Transbond™ XT; 3M Unitek/ESPE, Monrovia, USA). We bonded orthodontic edgewise brackets (Morelli, Rio de Janeiro, RJ, Brasil) on the permanent maxillary left central and right lateral incisors for anchorage and we used a push coil spring to recover lost space (Figure 2). Only the permanent maxillary right lateral and left central incisors were used for anchorage for final alignment (Figure 3). After thirteen months, the space has been recovered, the teeth aligned correctly and then the orthodontic appliances were removed (Figure 4).

The child returned for follow up visits every three months, when we examined the periodontal tissue health and carried out cold thermal pulp vitality tests (Endo-Ice, Hygenic Corp., Akron, Ohio). After 48 months, all the teeth involved in the treatment presented signals of pulp vitality. Radiographic image showed a slightly dilacerated root, although clinically it presented without pathological alterations (Figure 5).
Figure 3: Clinical image at the end of orthodontic traction.

Figure 4: A and B - Radiographic and clinical images of the right maxillary central incisor after 13 months of orthodontic traction.

Figure 5: Right maxillary central incisor after 48 months. A – Radiographic image showing slight dilacerations on right central incisor. B - Clinical image showing no pathological alterations.

DISCUSSION

Traumatic injuries in primary dentition during the developmental stages of the succedaneums permanent tooth interfere with its future growth due to the close relationship between the apices of primary teeth and the buds of permanent teeth. Intrusion and avulsion are the most common trauma associated with development developmental malformations of permanent
depending on the morphogenesis of tooth development, it could result in tooth malformations, as enamel hypoplasia, root and crown dilacerations and less frequently, odontoma.\textsuperscript{4,7}

Odontomas often disturb the eruption of teeth and can cause retention of primary teeth or abnormalities in tooth position, such as tipping or displacement of adjacent teeth and delayed eruption of a permanent tooth,\textsuperscript{10,11} generally it is the cause of odontoma recognizing.\textsuperscript{2} In a study with 39 cases in Japanese children, the most frequent causes of odontoma’s discover were delayed tooth eruption (49%), retention of the primary teeth (28%), incidentally found on radiographs (20%) and swellings of the jaw (3%).\textsuperscript{12}

Katz\textsuperscript{13} reported that odontoma diagnostic is apparently associated with age and location. According to Kaugars,\textsuperscript{10} the percentage of odontomas in the molar region gradually increases with each successive decade of life. Those lesions from incisor locations are diagnosed and treated at an earlier age than those from the canine or third molar regions. In the current case, the odontoma-like malformation was the cause of delayed eruption of a permanent successor, since the parents did not ask for treatment after the traumatic injury. The absence of any radiographic follow up resulted in late discovery of the abnormality and only occurred when the primary maxillary central incisor presented over retention and its successor did not erupt as expected. Removal of the odontoma-like malformation without disturbing the underlying tooth germ was the treatment goal.\textsuperscript{2,14,15} As has been reported in previous studies, the recurrence of an odontoma is uncommon\textsuperscript{10,16} even though, we followed up the patient during 48 months.

Usually, after odontoma removal the impacted tooth erupts normally until Nolla’s stage 6. However, if the impacted tooth does not erupt, exposure of the tooth crown and orthodontic traction should be applied. The observation period for impacted tooth eruption usually is approximately 3 months after removal of the odontomas.\textsuperscript{12} About 9.0% of odontoma removals are followed by orthodontic treatment.\textsuperscript{2} In the present case, 4 months after the removal of the odontomas the tooth had not erupted. Therefore an orthodontic traction was performed and the tooth alignment was successfully.

When an obstruction to tooth eruption is detected, it must be removed and orthodontic treatment should be performed when there is inadequate space in the dental arch for the proper positioning of a retained tooth.\textsuperscript{17} In some cases spontaneous eruption can be observed after odontoma removal.\textsuperscript{18} In the present case, the patient was referred to the pediatric dentist at 8 years old and the eruption did not occur because formation of the root of the impacted tooth was complete and provided little eruptive force.\textsuperscript{17,19} Thus, we carried out a surgery, under nitrous oxide
Due to children difficult behavior,\textsuperscript{20} to expose the impacted tooth crown and to traction orthodontically. In similar cases that dental root is under formation, after odontoma removal surgery, there is chance of spontaneous eruption. If it does not occur, the ideal conduct is to perform ulotomy or ulectomy and wait for spontaneous eruption. The pediatric dentist must be knowledgeable about the most efficient and suitable treatment for each dental development disturbance scenario and to intervene adequately.

Since odontomas represent a large proportion of odontogenesis lesions, it is necessary to establish early diagnosis and treatment. In the present case report, we must highlight that the sequelae caused by the trauma in primary dentition was managed by removing the odontoma-like malformation and reestablishing the esthetics and function of the impacted tooth.

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