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Surgical management of impacted primary teeth: report of two cases

ABSTRACT

Background *Impaction of deciduous teeth is an uncommon event. The purpose of this report is to describe two unusual eruption failures of a second primary molar and their treatment management.*
Case report *The diagnostic and therapeutic protocol of two cases selected at the Unit of Paediatric Dentistry, Department of Oral and Maxillofacial Science, "Sapienza" University of Rome, Italy, are presented. In both cases, the second deciduous molar was impacted, while no mechanical obstacle like odontomas or supernumerary teeth were present.*
Conclusion *The two case reports presented in this work are of scientific relevance, due to the rarity of this type of pathology.*

Keywords *Deciduous molar, Failed eruption, Impacted tooth, Primary tooth, Surgical treatment.*

Introduction

The impaction of deciduous teeth is a rare event, reported in the literature with an incidence of 1:10,000 cases (Bianchi and Roccuzzo, 1991; Amir and Duperon, 1982; Jarvinem, 1994). The tooth most frequently involved is the second molar, followed by the maxillary and mandibular central incisors. Primary failure of eruption must be distinguished from the secondary impaction often observed as a consequence of ankylosis (Rasmussen and Kotsaki, 1997; Alexander, 1992). This condition is relatively more frequent. In case of ankylosis, the deciduous tooth erupted but it did not follow the path of secondary eruption in order to follow the vertical growth of the alveolar bone. It has also been reported in the literature that pericoronal myxofibrous hyperplasia could present a hindrance to normal tooth eruption [Taguchi et al., 2005; Watanabe et al., 2001; Yonemochi et al., 1998]. Bianchi and Roccuzzo [1991] defined the criteria to be used to diagnose primary impaction: the tooth should be deeply positioned in the jaw; no cavities and restorations; no root resorption; frequent passing of the corresponding permanent tooth; possible retention and malposition of the adjacent permanent tooth. Although this type of impaction is rarely reported in the literature, some particular features could justify this lack. Indeed, primary impaction is most often asymptomatic.

The present report describes the unusual eruption failure of two second primary molars and their treatment management.

Case reports

The reports highlight the diagnostic and therapeutic protocol of two cases selected presented at the Unit of Paediatric Dentistry, Department of Oral and Maxillofacial Science, "Sapienza" University of Rome (Italy). In both cases, it was found the impaction of a second deciduous molar in which no mechanical obstacle, such as odontomas or supernumerary teeth, were present. After the clinical and radiographic examinations, and having evaluated the various possible treatment options, in both cases it was performed a radical surgical treatment with extraction of the impacted deciduous tooth. The patients then underwent a clinical and radiological follow-up in order to monitor the proper eruption of the corresponding permanent tooth.

Case 1

Clinical and radiographic examination

LC, a Caucasian boy of 9 years, came to our observation referred by his dentist who, through an orthopanoramic x-ray, had detected the complete inclusion of the second right upper deciduous molar. The medical history was noncontributory as far as systemic diseases, trauma or dental infection. There was also no familiarity of impacted deciduous teeth.

At the extraoral clinical examination the patient did not present any abnormalities, while the intraoral examination showed a mixed dentition with the absence of tooth 5.5, mesial tipping of tooth 1.6 and distal tipping of tooth 5.4 (Fig. 1). The panoramic radiograph showed the impacted tooth 5.5 and the ectopic position of tooth 1.5, which was horizontal, with the crown pointing distally. The roots development of the deciduous tooth appeared complete (Fig. 2). A CT scan was performed in order to assess the relationship between the impacted tooth and the adiacent teeth, which showed the palatal position of

tooth 1.5 with respect to tooth 5.5, the roots of which appeared ankylotic and in close relationship with the sinus membrane (Fig. 2A).

Treatment

The radical surgical treatment with extraction of the impacted tooth 5.5 was decided. The surgery was performed after a first orthodontic phase and followed by a second orthodontic treatment. The radical option was dictated by the following considerations:

- Impossibility of a normal eruption of tooth 5.5;
- The impacted tooth was interfering with the development and eruption of tooth 1.5;
- High risk of complications associated with the growth of the tissues of the tooth follicle (cyst, odontogenic tumors).

The patient then underwent an initial orthodontic therapy with the application of a Pendulum appliance to upright tooth 1.6 and to create an adequate arch space between teeth 1.6 and 1.4. Subsequently, it was possible to proceed with the extraction of the impacted deciduous molar. After local anaesthesia with vasoconstrictor, a V-flap from mesial to distal 1.4 1.6 was executed. An osteotomy was performed to expose the deciduous tooth (Fig. 3), in order to permit the odontotomy of the tooth with the goal to remove the root fragments that were confirmed to be ankylotic (Fig. 4). The flap then was repositioned and sutured with non-absorbable sutures.

After surgery, it was prescribed an antinflammatory and antibiotic treatment for 7 days and it was recommended a spray application of 0.2% chlorhexidine solution. After complete healing of the soft tissues, the third phase of the treatment was started by placing an orthodontic fixed appliance by bonding the upper incisors and upper first molars using self ligating brackets and a .014x.025 CuNiTi wire, in order in order to maintain an adequate space in the arch and allow eruption of tooth 1.5, which was monitored with periodic clinical and radiographic controls. The intraoral periapical radiographs and clinical examination performed at the 2-year follow-up (Fig. 5) showed the eruption of tooth 1.5 at the crestal level, as well as its rotation the complete development of the crown and the root.

FIG. 1 Intra-oral examination.

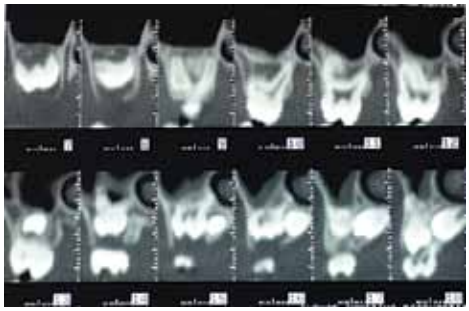

FIG. 2A, 2B Radiographic examination (CT scan and orthopan-oramic x-ray).

FIG. 3 Surgical exposure of the impacted tooth.

FIG. 4 Extracted fragments of tooth 5.5.

FIG. 5A, 5B Clinical and radiographic 2-year follow-up.

Case 2

Clinical and radiographic examination

A 9-year-old girl was referred to us by her dentist who, through the panoramic x-ray, detected the impaction of the second deciduous upper left molar. The medical and dental history of the child was noncontributory. There was no familiarity for the inclusion of deciduous teeth and the area of the impacted tooth was asymptomatic.

The extraoral clinical examination showed no pathological signs. The intraoral examination revealed a mixed dentition in which the absence of tooth 6.5 was evident (Fig. 6). The panoramic x-ray comfirmed the complete impaction of tooth 6.5, which was located at the level of the floor of the left maxillary sinus; moreover, the impacted tooth had an inverted position compared to tooth 2.5 (Fig. 7). A CT scan was performed to check the exact location of the impacted deciduous molar and its relationship with the adjacent anatomical structures. The CT confirmed the inclusion of tooth 6.5, highlighting

the close relationship of the root tips within the maxillary sinus (Fig. 7A).

Treatment

Considering the high risk that tooth 6.5 could have been ankylotic and its location at the level of the sinus floor, the treatment plan included the following steps: surgical repositioning of the second permanent premolar. Surgical repositioning and subsequent extraction of the included second deciduous molar. After anaesthesia with vasoconstrictor, a V-flap was performed extending from 2.6 to 6.3. Afterwards, a first osteotomy was performed in order to expose the crown of 2.5. The second premolar was repositioned coronally with the aim to detach it from the middle third of root of 6.5. Then, a second osteotomy was carried out 2 mm apical to the previous one, to expose the crown of tooth 6.5 (Fig. 8). Multiple odontotomy was necessary to extract 6.5. This extraction resulted in a communication with the maxillary sinus as expected from the treatment plan. After extraction of tooth 6.5, tooth 2.5 was splinted to tooth 2.6 with composite resin (Fig. 9); then, the flap was sutured with absorbable material. In this case, the suture was removed after seven days and a postoperative therapy (antibiotic + 0.2% chlorhexidine) was prescribed.

After 40 days, the splint was removed and a vitality test was performed, with a positive outcome. The normal development of the repositioned second premolar has been monitored through periodic clinical and radiographic follow-ups; in particular, the intraoral x-ray performed at 2 years after surgery (Fig. 10A) shows the complete formation of the middle and apical third of the root, which maintained its vitality.

Discussion

In order to treat a primary tooth impaction different treatment options are available. The treatment plan depends on the type of inclusion and the characteristics of the tooth. Where the tooth has enough space to erupt in the arch or a favourable axial direction, and in the absence of morphological crown or root abnormalities, the surgical exposure of the tooth should be performed with the removal of the gum and bone tissues. This technique can be associated with the possible removal of pathological conditions that hinder the normal eruption like odontomas, cysts, and supernumerary teeth. This strategy can be described as conservative surgical method. The impacted tooth must be kept under observation for three months and, in the case of nonspontaneous eruption after this period, an orthodontic traction should be applied. This approach can be defined as surgical-orthodontic. Finally, when eruption is not possible due to an obvious ankylosis or abnormal eruption path, the tooth should be extracted (radical surgery therapy). The treatment options proposed are in accordance with the recommendations of Otsuka et al. [2011] for primary

FIG. 6 Intraoral examination.

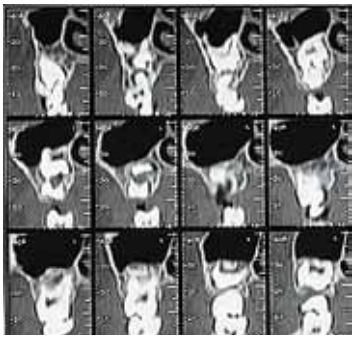

FIG. 7A, 7B Radiographic examination (CT scan and orthopanoramic x-ray).

FIG. 8 Surgical exposure of the impacted tooth.

FIG. 9 Extraction of tooth 6.5 and splinting of tooth 2.5 to 2.6.

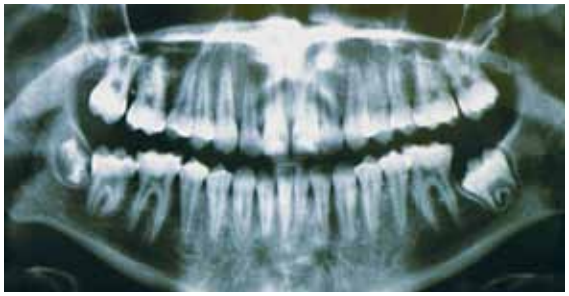

FIG. 10A 10B Clinical and radiographic 2-year follow-up.

teeth. We agree on the need of a long-term observation to monitor the eruption process of the premolars, as some authors stated [Hayashi-Sakai et al., 2005] that a delay in the eruption of premolars is not uncommon and sometimes failure of eruption of primary molars could delay the mineralisation process.

Conclusion

The two clinical cases reported in this paper are to be considered scientifically relevant taking into account the rarity of this pathological event in childhood.

Consent

Written informed consent was obtained from the patient's parents for publication of these case reports and any accompanying images.

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