Open Journal of
Clinical & Medical
Case Reports

Volume 2 (2016)
Issue 2

ISSN 2379-1039

Surgical Treatment for Severe Dental Ankylosis in a Three Year-Old Child

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Abstract

A three year and 10 month-old male attended the dental paediatric department of Centro Universitário Newton Paiva (CUNP), accompanied by his mother, and presented a severe stagnation of the eruptive process of the tooth 54. At this time, only the mesial-bucal cusp of the referred tooth was clinically visible. According to the tomography of this tooth, the diagnosis of severe dental ankylosis was evident. In order to prevent craniofacial disorders, an immediate dental extraction was the chosen treatment. The patient's behaviour was one of the determinant factors for the surgery being done under general anaesthesia. The surgical procedure was completed with infection control during four stages: dieresis, exeresis, haemostasis and synthesis. The management of this patient with severe dental ankylosis is discussed.

Keywords

Ankylosis; Primary Molars; Infra-eruption; Treatment

Introduction

Dental ankylosis is defined as an anatomical fusion amongst dentine and/or cement and the alveolar bone. Furthermore, it is a progressive anomaly eruption that may affect both dentitions, deciduous and permanent. There are some theories that attempt to explain the ankylosis manifestation as a consequence of the local metabolism disruption, local mechanic trauma and genetic factors. In addition, there are even more agents appointed as causes of this pathology, such as local infections, eruption force deficiency, abnormal tongue pressure, chemical and thermic irritation and compression in the dental arch that lead to infraocclusion in the tooth. These elements may act simultaneously or independently of each other. [1, 2, 3, 4, 5]

The literature shows a prevalence ratio of dental ankylosis in deciduous molars from 1.5% to 9.9% [2]. Other paper [5] state that the prevalence of dental ankylosis in deciduous dentition is between 1.3% and 38.5%. Therefore, it is still possible to observe that the prevalence is almost ten times higher amongst deciduous teeth than permanent teeth and it is two times more frequent in the mandible than in the maxillary [6]. Moreover, it may be unilateral or bilateral and it can affect both genders [6].

Dental ankylosis may be classified into three degrees according to its extension. In the slight degree, the occlusal surface is located around 1mm below the oclusal plane. In the moderate degree, the occlusal surface is in the equatorial area. In the severe degree it is situated at or below interproximal gingiva level, comparing one or both adjacent dental surfaces [7].

The treatment is dependent on the degree of infraocclusion. For slight and moderate cases, only observation is recommended, until it reaches exfoliation or, in some cases, it may be advised to dislocate the ankylosed tooth in order to rupture the fusion areas, allowing the eruption. The most frequently suggested treatment for severe cases is extraction. This conduct represents 78.1% of outcomes for ankylosed teeth. It is necessary for posterior orthodontics to follow, with the purpose to maintain space in the dental arch or recover it [1, 8].

The dental ankylosis has a dramatic impact on dental and craniofacial development. The ankylosis consequences depend on the oclusal and facial forming stage when the pathology was installed, the growth remaining for the patient and the timing of the initial intervention [1, 3].

In order to maintain severe ankylosed teeth, substantial damages may be generated. The effects can be malformation, late maturing, abnormal eruption and rotation on the permanent successor, and the transeptal fibres can alter the Spee bend. The Speed bend is an antero-posterior imaginary line that goes from the posterior teeth's cusps to incisive borders on the anterior teeth. This line must be slight and almost straight in order to establish the right function in disocclusion [9]. In addition, this issue may lead to a loss of space in the dental arch, over eruption of the antagonist tooth, migration of the successor tooth, and increase the risk of caries and periodontal disease due to food impaction in the infraoccluded tooth [1, 3, 10]. Unilateral ankylosis might cause middle line bone changes. In regards to the cranium, dental ankylosis affects the hard tissue extension in two ways: the ankylosed tooth prevents growth, reducing the bone progression in the ankylosed side. On the other hand, if the deciduous infraocluded tooth were larger than its permanent successor, this might create a space larger than necessary and could deviate the middle line to the opposite side. Ankylosed teeth can also produce an open bite, interfering in phonetics and chewing [1, 3, 10]. In light of the importance of this topic, the objective of this paper is to report a clinical surgical approach applied in a severe ankylosed tooth 54 in a non-cooperative three year-old child from diagnosis to the post-operative cares, preparing to erupt the successor.

Case Report

The patient: B.A.P.S., male, (3) three years and (10) ten months old, caucasian, attended Centro Universitário Newton Paiva Paediatrics Clinics (CUNP), accompanied by his mother, and presented stagnation on the eruptive process of the tooth54

After detailed anamneses, a clinical exam was conducted. There is no record related to systemic alterations that were diagnosed in this patient. Specifically analysing the mouth, it was observed that the right deciduous maxillary first molar was infraoccluded (tooth54) presenting oclusal surface at the interproximal gingival level. According to a percussion test, tooth 54 presented a characteristic sound indicative of dental ankylosis.

Complementary exams were necessary in order to confirm the diagnosis. Local image examination was utilized, in particular periapical X-ray and tomography. On the periapical X-ray (Image 3), it was not possible to envisage the periodontal ligament space as a consequence of the successor

tooth's image superposition. On the tomography, a lack of periodontal ligament continuity and areas of cementum/alveolar bone fusion were observed (Image 4). Therefore, deciduous dental ankylosis was identified as the final diagnosis.

Extraction is suggested as the treatment for severe dental ankylosis. Once the severe deciduous dentalankylosis diagnosis had been confirmed and the presence of the successor element had been seen through image exams, a surgery was proposed in order to prevent craniofacial disorders.

All legal and physical considerations were taken before the surgery. The patient`s parents were carefully informed and clarified of the legal responsibility, as well as all the implications and risks related to surgical procedures. Then, the agreement term to the treatment was signed. Regarding systemic assistance, the surgical risk exam was requested.

The patient's behaviour was one of the determinant factors for this surgery's intervention. Due to his low age (3 years old), the patient was not cooperative to ambulatory treatment. Therefore, the surgery was done in the Municipal Odilon Bherens Hospital's surgical centre under general anaesthesia.

In the surgery room all infection and haemostatic control requirements were followed. The procedure was started, establishing oral and perioral antisepsis, utilizing chlorhexidine as a topical antibiotic. In sequence, the local injection of 2% lidocaine and 1:100.000 epinephrine was made in order to minimize bleeding in the gingival borders of tooth 54.

The surgical procedure was completed during four stages. In the dieresis stage, an initial incision intra furrow was made, as an envelop using scalpel number 15 and Ward's number 02 as a periosteal elevator. Subsequently, exeresis was done using a straight luxator, with the purpose of removing element 54. The haemostasis was made by pressing gauzes upon this area. The last surgical part was the synthesis. In the synthesis, the Chompret procedure was performed, with the view to approximate the alveolar boards and re-absorbable suture (Image 5). The patient was kept in observation for some hours, and was then given medical release on the same day.

The post-surgical procedure was done in the CUNP dental clinic. Initially, the consultations were monthly, by virtue of biofilm control and observation of healing. After some months, the consultations stretched to two times per year for orthodontic evaluations.

In this case, the immediate orthodontic treatment was not indicated following the surgery. Due to the patient's age and absence of dental support to the space keeper, it was decided to observe clinically and radiographic the case. In the late evaluation (Image 6) when the patient is already 6 year-old, it will be initiated an orthodontic interception with the purpose of recover the arch space that was lost because of the ankylosis presented in the tooth 54. Recovering this arch space, it will be re-established the right deciduous second molars terminal plane that will allow normal oclusal development.

Discussion

Considering the infraocclusion, the patient's age and the presence of the permanent successor tooth, the treatment performed is discussed. There are four different ways to treat dental ankylosis: clinical and radiographic following construction of oclusal and lateral contacts, dental luxation in order to fracture the ankylosis bone fusion or extraction of the tooth affected as soon as possible [1, 5].

Severe ankylosis requires radical treatment. The deciduous tooth must be removed to allow the

eruption of the permanent successor. This is to indicate the extraction of the ankylosed when it is at interproximal gingiva level. It is also an indication of surgery required for those teeth that present a slow process or delay in the deciduous radicular reabsorption. The best moment to extract an ankylosed tooth is when the X-ray shows that the permanent successor tooth is in 8 Nolla's stage, which means, two thirds of the root was formed [10,11].

The premature ankylosis tends to become more consolidated. It is because the absence of micro moving contributes to the progressive bone-cementum fusion that makes the surgery complicated. The postponing of ankylosed teeth extraction and the adjacent tooth migration into the ankylosed area make the surgical procedure even more complex [1, 12].

Severe deciduous ankylosis does not prevent spontaneous tooth exfoliation. Even though the literature indicates that premature surgical treatment of deciduous ankylosis is the best option to reduce sequelaes in the craniofacial growth, [8] it assumes that severe deciduous dental ankylosis does not inhibit the late spontaneous exfoliation of deciduous molars, of which there is a delay rate of six months.

Permanent teeth eruption might recover bone space in a dental arch. It was [13] observed that in15 patients whose ankylosed teeth were extracted, 14 presented dental arch space loss. However this loss was re-taken through the eruption of premolars.

In spite of [8, 13] this statement, there is a consensus in the literature that the most common and recommended treatment to severe deciduous dental ankylosis is surgical extraction.

Therefore, the dentist's approach plays an important role in diagnosis and suitable treatment, whether surgical or conservative. Surgical treatments prevent complications caused by severe dental ankylosis in children in the deciduous dental phase. Those procedures prepare appropriated conditions to the successor permanent tooth eruption.

Figures

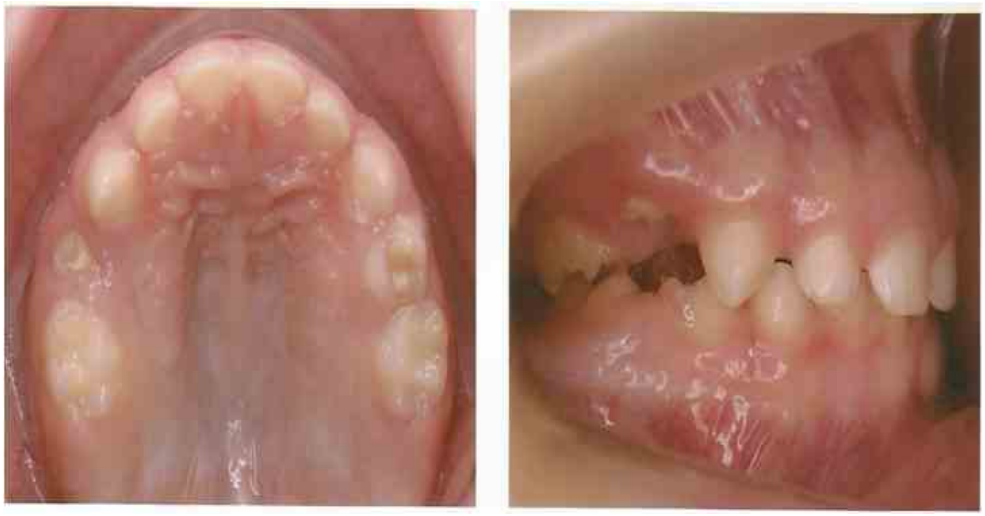

Fig 1: Clinic aspect of tooth 54 submersion. Superior and lateral view.

Fig 2: Lateral right view. Casts superior and inferior in occlusion

Fig 3: Element 54 radiographic aspect. Successor tooth superposition, hiding the periodontal ligament.

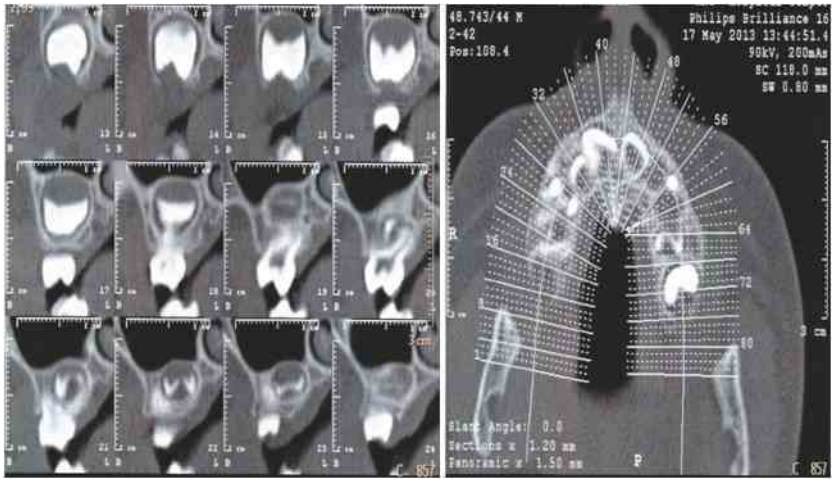

Fig 4: Local tomography of tooth 54 area.

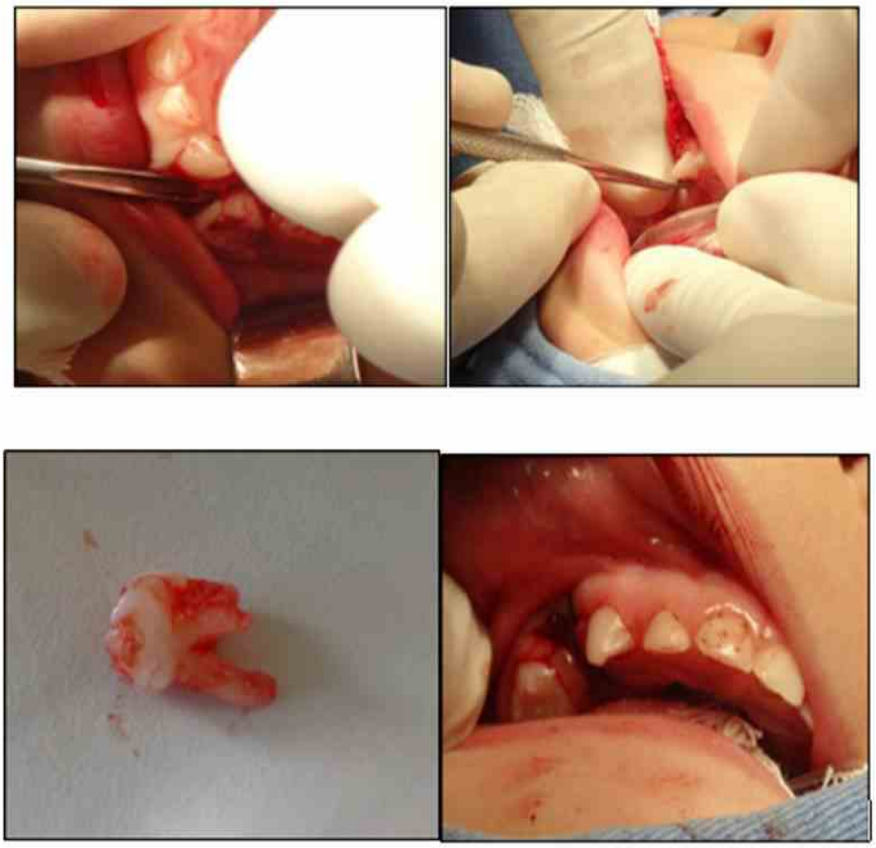

Fig 5: a) Periosteal elevation; b) Exeresis; c) Element 54; d) Suture.

Fig 6: a) Radiographic exam of the tooth 14 and its space to eruption; b) Clinical exam of the space lost due to the ankylosed tooth.

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Manuscript Information: Received: October 01, 2015; Accepted: January 25, 2016; Published: January 26, 2016

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Citation: Barbosa JMN, Santos RR, Fernandes S, Santos de Paula L, Furtado VS, Fernandes M. Surgical treatment for severe dental ankylosis in a three year-old child. Open J Clin Med Case Rep. 2016; 1071

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