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CASE REPORT

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Root resorption after dental trauma in permanent molar: a 5-year follow-up

Reabsorção radicular após trauma dentário de molar permanente: 5 anos de acompanhamento

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ABSTRACT

Introduction: There is low incidence of trauma in posterior teeth, and their complications are rarely reported in the literature. This report describes a case of internal root resorption with communication with the periodontal area as a result of traumatic dental injury of a permanent molar tooth. **Case Report:** The treatment consisted of chemo-mechanical preparation and the use of calcium hydroxide as intracanal medication, followed by filling and sealing of the resorption area with mineral trioxide aggregate. **Results:** After 5 years of follow-up, the tooth was in function, without signs or symptoms and the resorption area was repaired. **Conclusion:** We emphasize the importance of follow-up in cases of dental trauma, even in cases of low severity, such as subluxative injury, in order to predict possible sequelae in advance. The correct approach to treatment of the resorption area and sealing with mineral trioxide aggregate ensured the successful outcome of the case.

KEYWORDS

Molar; Dentition permanent ;Tooth injuries; Root resorption.

RESUMO

Introdução: Há uma baixa incidência de trauma nos dentes posteriores e as suas complicações são raramente relatadas na literatura. Este relato descreve um caso de reabsorção radicular interna com comunicação com a área periodontal como resultado de trauma dentário de um molar permanente. **Relato de Caso:** O tratamento consistiu no preparo químico-mecânico e a uso de hidróxido de cálcio como medicação intracanal, seguido por enchimento e selamento da área de reabsorção com agregado trióxido mineral. Após 5 anos de acompanhamento, o dente estava em função, sem sinais ou sintomas e a área de reabsorção reparada. **Conclusão:** Ressaltamos a importância do acompanhamento em casos de trauma dentário, mesmo em casos de baixa severidade, como a subluxação, a fim de prever possíveis sequelas com antecedência. A abordagem correta para o tratamento da área de reabsorção e o selamento com agregado trióxido mineral assegurou o sucesso do caso.

PALAVRAS-CHAVE

Dente molar; Dentição permanente; Traumatismos dentários; Reabsorção radicular.

INTRODUCTION

Traumatic dental injury (TDI) in permanent teeth is a common occurrence and there may be a prevalence of approximate 20% [1], with the anterior region being the most affected [2]. Nevertheless the incidence of trauma in posterior teeth is low, and their complications are underreported in the literature [3,4]. The main causes of TDI are falls, collisions and sports practice [3]. However, the risk during sports practice varies according to the type of sport practiced, gender, level of competition and exposure time [5].

TDI may lead to injuries of different severities, which are determined by the force and direction of the impact [6]. As a result of severity of the injury, various sequelae can be expected, such as complications in pulp and periodontal ligament healing which may lead to pulp necrosis, obliteration of the root canal, root resorption and loss of the supporting bone [7]. The prognosis depends on the stage of tooth development, type, severity and combinations of traumatic injuries [8]. Luxation injuries are the most likely to result in root resorption, whereas in cases of concussion and subluxation, this type of complication is less likely to develop [9].

Resorption is a late complication and it is diagnosed by radiographic exam [6]. However, in the early stages, this diagnosis is difficult to make [10]. Therefore, resorption is generally diagnosed at later stages, in which communication between the pulp canal space and periodontal tissues may occur. In such cases, Mineral Trioxide Aggregate (MTA) is considered the material of choice because of its good sealing characteristics and biocompatibility [11]. In addition, it creates a favorable periodontal healing environment, which allows the growth of new cementum on its surface [12].

This report describes a case of internal root resorption with communication with the periodontal area as a result of TDI in a permanent molar tooth, with a successful clinical and radiographic outcome after 5 years of follow-up. To the author's knowledge, in the literature there are no reported studies that have assessed the long-term complications caused by TDI in posterior teeth.

CASE REPORT

The patient, a 23-year-old man, sought care at the Dental Clinic of an Institution of Higher Education due to sensitivity and sinus tract in the right permanent first molar region. The patient reported a history of trauma about 12 months previously while practicing taekwondo, in which he had experienced tooth loosening and sensitivity to touch. At the time, he sought the care of a health professional, and splinting with orthodontic wire for 15 days and occlusal adjustment were performed. According to the patient's report, there was no subsequent follow-up.

On the clinical examination, there was a small edema and a sinus tract in the buccal region of the first right permanent molar, which was nonvital, as assessed by cold test (Endo Ice, Hygenic Corp., Akron, OH, USA). There was mild sensitivity to palpation and vertical/horizontal percussion. Periodontal probing was considered within normal limits. The radiograph showed an area suggestive of internal root resorption in the middle-cervical third of the mesial buccal (MB) canal, and there was widening in the periodontal ligament space of the first right permanent molar (Figure 1A). When sinus tracking was performed by inserting a gutta-percha cone, the cone went directly to the apex of the MB root (Figure 1B). Under local anesthesia and after placement of a rubber dam, access to the pulp chamber of the first right permanent molar was performed. After access, the canals were irrigated with 2.5% sodium hypochlorite, and shaped with the rotary Profile System (Dentsply - Maillefer, Ballaigues, Switzerland). During instrumentation, intense bleeding from the MB canal was observed, probably due to communication with the periodontal tissue. This canal was therefore, irrigated with a solution of calcium hydroxide powder and sterile distilled water. After controlling the bleeding, the canals were dried with sterile paper cones and filled with calcium hydroxide powder mixed to a paste with sterile distilled water (1:1). After 7 days, closure of the sinus tract occurred. The intracanal medication was removed and the MB canal was reshaped with the same protocol used in the first visit. Again some bleeding from the cervical portion of the MB canal was observed. Thus, the canal was refilled with intracanal medication consisting of calcium

hydroxide powder mixed to a paste with sterile distilled water (1:1). Ten days later, the tooth showed a negative response to palpation and the percussion test, absence of bleeding and the sinus tract was nonexistent. Then the canals were filled with gutta-percha and Pulp Canal Sealer (SybronEndo, Sybron Dental Specialties Inc, Orange, CA), by means of the continuous wave of condensation technique, using the System B Heat-Source (System B, Analytic Technology, Redmond, USA). However, in the MB canal, in addition to apical sealing with gutta-percha and sealer, the middle and coronal thirds of the canal were sealed with gray MTA (Pro-Root MTA, Dentsply, Tulsa Dental, OK, USA) (Figure 2A). After endodontic filling, resorption areas were also observed in the palatine canal (Figure 2B). Immediate coronal sealing was performed with light-cured light polymerized resin and the patient was referred to another professional for prosthetic reconstruction.

Clinical and radiographic examination after 05 years showed no evidence of swelling or sinus tract, the tooth was not sensitive to percussion, and the patient did not report any symptoms. A radiograph showed complete healing of the periradicular area (Figure 2C).

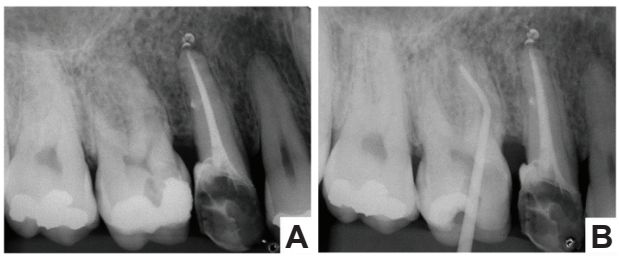

Figure 1 - A) Initial radiograph; B) Tracing of the sinus tract.

DISCUSSION

Approximately 11-40% of all sports injuries involve the face. These lesions are more common due to direct contact with the ball or player-to-player [13]. The most common TDI in sports are crown fractures, soft tissue injuries and subluxations [14]. Despite this high incidence, sports practice as an etiological factor for TDI is higher in school-aged children than in teenagers and young adults [1].

The patient report suggested that the injury suffered by practicing taekwondo was a subluxation, which is characterized as an abnormal loosening of the tooth without its displacement [15], as a result of a lower periodontal ligament impact [16]. The treatment depends on the degree of mobility, and the splint may be indicated in cases of severe mobility [17].

According to the patient's report, the initial treatment was the placement of an orthodontic wire splint for a period of 15 days. It was not possible to determine whether the splinting used was rigid or semi-rigid, because the first examination was performed by another professional. Rigid splinting can lead to pulp canal obliteration [18], which was not observed in the present case; or to pulp necrosis [19], which occurred in this case and was associated with root resorption. However, a systematic review suggested that prognosis is determined by

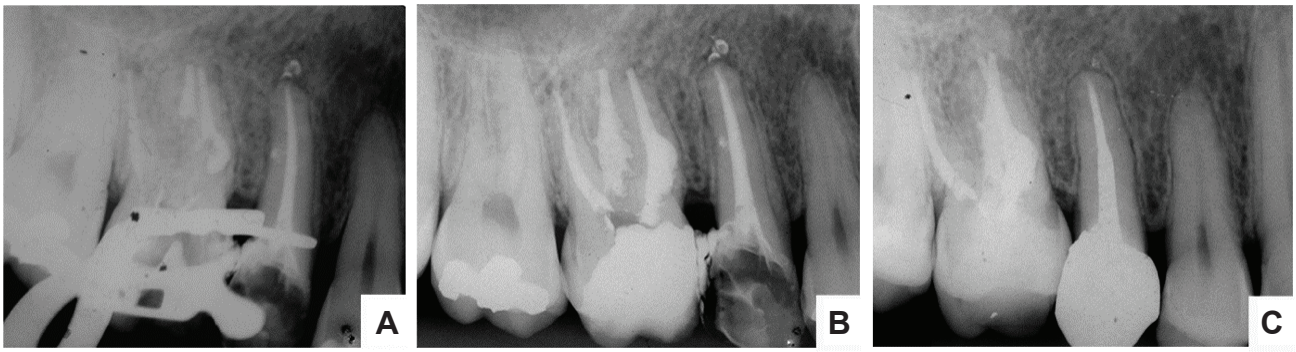

Figure 2 - A) Apical segment filled and MTA in the mid-cervical third; B) Final filling; C) Radiograph of follow-up 5 years after filling.

the type of injury rather than factors associated with the splinting [20].

Internal resorption occurs due to inflammation of the apical pulp tissue caused by the coronal pulp infection and necrosis [21]. However, as verified in this report, the pulp may become non-vital after the resorption period, and an apical inflammation may develop [21]. The diagnosis of resorption was made by radiographic examination, which showed a radiolucent oval shaped enlargement in the root canal space area, characteristic of this type of complication [9,22].

Pulp necrosis is considered the most common dental trauma complication [23,24]. Studies have shown that 13.2 to 16.5% of teeth become necrotic after subluxation [24,25], however internal resorption was found in only 1.9% of the cases [24]. It is important to note that all of these previously mentioned studies examined anterior teeth [16,23,24]. To the author's knowledge there are no studies that have assessed long-term complications caused by TDI in posterior teeth.

The follow-up of patients with dental trauma is essential. In cases of subluxation, radiographic monitoring is recommended, beginning in the first four weeks and continuing for one year to eliminate the possibility of healing complications occurring [6,15]. However, the majority of pathological injuries are usually diagnosed in the first 3 months [23].

The goal of treatment of teeth with internal resorption is to remove all the blood supply from the canal) [9,22]. Calcium hydroxide was used as an intracanal medication in order to maximize the disinfection of the necrotic tissue in the resorption area, facilitate its removal, prevent the invagination of the tissue into the canal and to reduce bleeding [9,22].

The success of perforation repair depends on an adequate marginal seal between the material and walls of the perforation. In the present case, filling was performed by the continuous heat wave condensation technique with the use of MTA to repair the defect caused by resorption. The choice of MTA was based on its superior properties in terms of biocompatibility and long-term sealing ability [11].

In this study, after five years of follow-up, the tooth was asymptomatic and there was complete healing of the periradicular lesion, demonstrating that the treatment described here was successful. Based on the long term result of the reported case, the MTA proved to be a good option for the treatment of teeth with invasive inflammatory resorption.

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