Alternative treatment for traumatized teeth with inflammatory root resorption: 4 years follow-up

Tratamento alternativo para dentes traumatizados com reabsorção radicular inflamatória: 4 anos de acompanhamento

Tratamiento alternativo para dientes traumatizados con reabsorción radicular inflamatoria: 4 años de seguimiento

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RESUMO

Objetivo: Este relato descreve o tratamento de um incisivo central superior previamente traumatizado, afetado pela reabsorção radicular inflamatória interna / externa. **Método:** Trata-se do relato de caso de um paciente com 12 anos de idade que relatou um trauma de queda um ano antes da consulta, causando fratura da coroa e luxação intrusiva no incisivo central superior direito. Os exames clínicos verificaram sensibilidade à percussão e descoloração da coroa. Radiograficamente, as áreas radiolúcidas sugeriram reabsorção radicular inflamatória (no terço da raiz cervical) e lesão periapical. **Resultados:** O tratamento endodôntico foi realizado, com uma pasta de hidróxido de cálcio com paramonoclorofenol canforado inserida no canal radicular por 2 meses. Quando uma barreira calcificada na área apical foi observada radiograficamente, toda a raiz foi obturada com agregado de trióxido mineral (MTA). O dente foi acompanhado por 4 anos, mostrando regressão dos sintomas, cicatrização por reabsorção e também aumento no comprimento radicular. **Conclusão**: O presente caso mostrou que o tratamento endodôntico associado ao MTA promoveu a remodelação óssea da área periapical e paralisou a reabsorção.
Descritores: Reabsorção radicular;Traumatismos dentários; Endodontia.

ABSTRACT

Objective: This report describes the treatment of a previously traumatized central central incisor affected by internal/external inflammatory root resorption. **Method:** This is the case report of a 12-year-old patient who reported a fall trauma one year before the consultation, causing crown fracture and intrusive dislocation in the right upper central incisor. Clinical examinations verified sensitivity to percussion and discoloration of the crown. Radiographically, radiolucent areas suggested inflammatory root resorption (in the third of the cervical root) and periapical lesion**. Results:** Endodontic treatment was performed with a calcium hydroxide paste with canouted paramonochlorophenol inserted into the root canal for 2 months. When a calcified barrier in the apical area was observed radiographically, the entire root was computed with mineral trioxide aggregate (MTA). The tooth was followed for 4 years, showing regression of symptoms, healing by resorption and also increase in root length. **Conclusion:** The present case showed that endodontic treatment associated with MTA promoted bone remodeling of the periapical area and paralyzed resorption.
Descriptors: Root resorption; Tooth Injurie; Endodontics.

RESUMEN

Objetivo: Este informe describe el tratamiento de un incisivo central central previamente traumatizado afectado por la resorción de raíz inflamatoria interna/externa. **Método:** Este es el informe del caso de un paciente de 12 años que reportó un trauma de caída un año antes de la consulta, causando fractura de corona y dislocación intrusiva en el incisivo central superior derecho. Los exámenes clínicos verificaron la sensibilidad a la percusión y la decoloración de la corona. Radiográficamente, las áreas radiolúcidas sugirieron resorción inflamatoria de la raíz (en la tercera de la raíz cervical) y lesión periapical. **Resultados**: El tratamiento endodóntico se realizó con una pasta de hidróxido de calcio con paramonoclorofenol canouted insertado en el conducto radicular durante 2 meses. Cuando se observó radiográficamente una barrera calcificada en el área apical, toda la raíz se calculó con el agregado de trióxido mineral (MTA). El diente fue seguido durante 4 años, mostrando regresión de los síntomas, curación por resorción y también aumento en la longitud de la raíz. **Conclusión:** El presente caso mostró que el tratamiento endodóntico asociado con la MTA promovía la remodelación ósea de la zona periapical y la resorción paralizada.
Descriptores: Reabsorción radicular; Trauma dental; Endodoncia.

ORIGINAL

Introdução

The pulp and root physiological development of a permanent tooth with incomplete rhizogenesis can be compromised by traumatic injuries, since certain injuries result in damage to the insertion periodontium, such as the periodontal ligament and cementum.[1] The greater the severity of the injury, the more complicated are the consequences for the teeth involved. Such lesions can lead to pulp necrosis, interruption of root development and inflammatory or replacement root resorption.[2]

Intrusive dislocation is one of the most severe types of traumatic dental injuries, since it leads to serious complications, such as resorption related to repair, resorption related to infection, ankylosis and even tooth loss.[3-5]

The treatment for teeth that undergo intrusion will depend on the stage of root development, time and quantity in millimeters of the intrusion. [6] In these cases, an injury occurs to both the pulp and the apical nerve vascular bundle, as well as to the periodontal tissue, which can cause pulp necrosis, with subsequent infection and inflammatory root resorption.[3]

The incidence of root resorption in teeth affected by intrusive dislocation is 12 to 80% .[3,7] Thus, in order to stop this process, it is necessary to eliminate the intracanal infection and seal the resorbed surfaces.[8]

As a therapeutic alternative for sealing the reabsorbed root surfaces, Mineral Trioxide Aggregate (MTA) presents itself as an efficient resolving material, as it is biocompatible, has a good behavior in the presence of blood and moisture, good sealing properties, excellent marginal adaptation and for its inducing effect of formation of calcified tissues. Thus, MTA is a viable treatment option, as it improves the cases of healing in cases of inflammatory root resorption, and can be used both surgically and even intracanal.[8-9]

Thus, the present study aims to report the case of a young patient who, after a dental trauma, presented internal and external resorption and was treated with endodontic therapy and MTA, without the need to perform an additional surgical procedure.

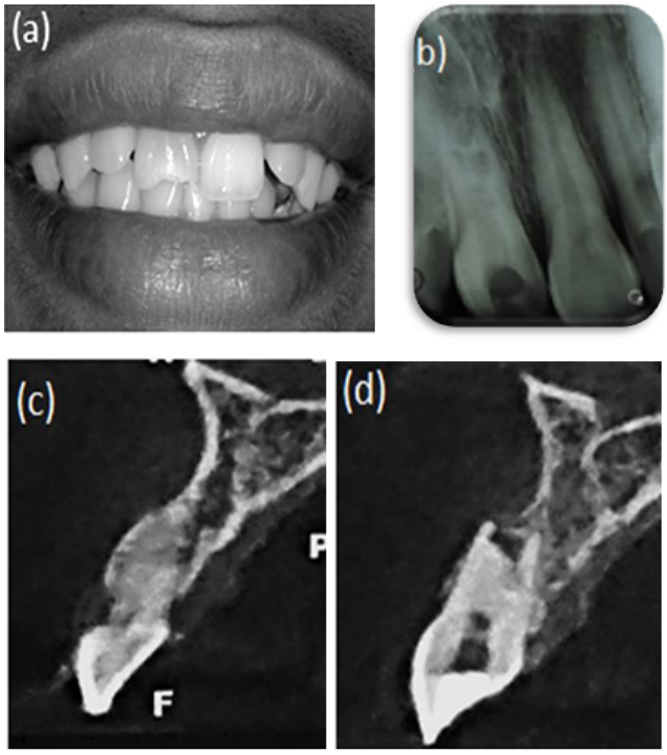
Method

A 12-year-old male patient was referred to the School of Dentistry of the higher education institution in the State of Bahia , 01 year after suffering dental trauma during a soccer game complaining about discoloration and fracture in his maxillary right central incisor (#11). The parents stated that an endodontic treatment had been initiated 06 months, but it was interrupted. After the patient's general dental trauma and medical history was recorded, a clinical examination was performed revealing an uncomplicated crown fracture associated to an intrusion of 2 mm of the #11.

The injured tooth had no mobility, but it was slightly sensitive to vertical percussion (normal sound) and palpation. Periodontal scan showed absence of periodontal pocket in the unit. Radiographic examination showed immature root development, associated to a partial tooth intrusion and radiolucent areas in the apical third and along radicular surface suggesting the development of root resorptions (Figure 1).

In compliance with Resolution 466/2012, of the National Health Council, this study was submitted to and approved by the Research Ethics Committee of the federal institution of higher education where the research took place, being approved on April 12, 2019 under protocol no. 2,072,113.

Figure 1- Radiographic examination. Bahia, 2020.



Legend- (a) Clinical and (b) Radiographic view of the right central incisor at first visit; (C) CBCT scan showing sagittal view of tooth 11 with an external and internal resorptive defect.

Cone beam computed tomography (CBCT) images confirmed the existence of internal and external root resorptions placed in the apical and cervical radicular thirds (Figure 1). Apexification of the immature tooth was proposed to the patient and his guardians which agreed with the treatment by signing an informed written consent.

Results

The treatment started with a local infiltrative anesthesia followed by rubber dam isolation. The root canal was accessed and instrumented, under 2.5% sodium hypochlorite irrigation, until the work length (1-mm distance from the radiographic root apex) reaching a diameter corresponding a K-file #100 (Maillefer, Ballaigues, Switzerland).

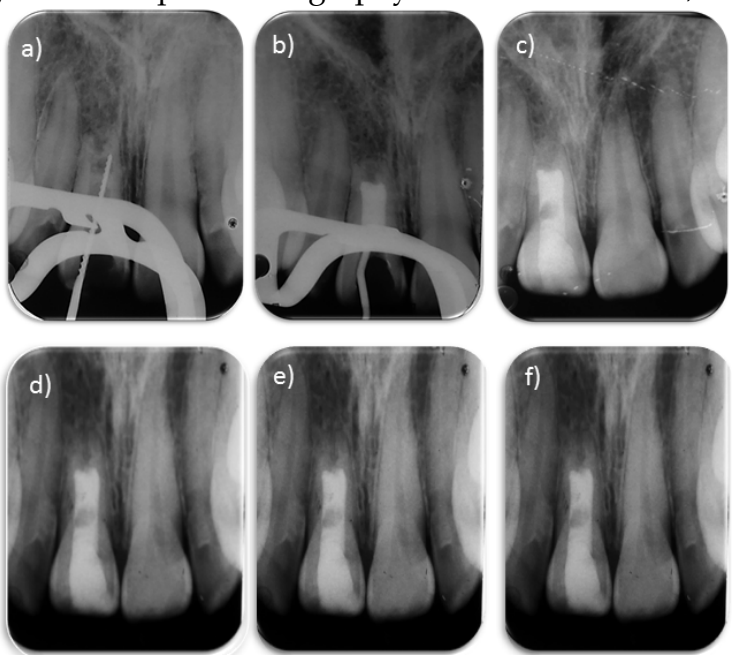
After the root canal instrumentation, a final rinse with 17% EDTA solution (Bioethics, Bahia, Brazil) activated by hand files was carried out for 3 minutes. Root canal was dried with sterile paper points (Dentsply- Maillefer, Ballaigues, Switzerland) and medicated with a camphorated paramonochlorophenol and calcium hydroxide-based paste (Calen, SS White Artigos Dentários Ltda., Rio de Janeiro, RJ, Brazil). The coronal access was sealed with a sterile cotton pellet and temporary restoration (Coltosol; Vigodent, Rio de Janeiro, Brasil).

After 2 months, tooth was asymptomatic and root canal was again accessed and the intracanal medication was removed through 2.5% NaOCl irrigation which was complemented with an additional ultrasonic activation of

NaOCl for 30 seconds and a final rinse with 17% EDTA. After calcium hydroxide removal, a radiographic exam was performed, demonstrating a calcified bridge formation in the apical third of root canal (Figure 2) . After all the extension of root canal was filled with Agreggated Trioxide Mineral (MTA) (WhitePro-Root MTA; Dentsply-Maillefer, Ballaigues, Switzerland) [9]. Small amounts of MTA were introduced into the root canal, and a final radiograph was taken to check the MTA placement (Figure 2). The access cavity was sealed with glass ionomer cement and light-cured composite resin (TPH Spectrum Dentsply/DeTrey, Konstanz, Germany).

The patient was recalled to perform clinical and radiographic follow-up for 48 months (Figure 2). Periapical radiograph at 48 months showed absence of periradicular radioluscency, inhibition of the root resorption process, and progressive repair of the periodontal ligament (Figure 2).

Figure 2-Periapical radiography at 48 months.Bahia, 2020.



Legend. a) Detection of calcified bridge in the apical third; b) Mineral trioxide aggregate (MTA) obturation of the root canal; c) Final Radiographic ; d) Radiographic follow-up at 12 months demonstrating stability of the resorption and periapical healing; e) Radiographic follow-up at 24 months; f)48-month radiographic view, demonstrating complete healing.

Discussion

Root resorption is generally associated to intruded teeth that entail the root being forced in the alveolar bone leading to extensive damage to root and adjacent tissue [4,10,11]. The resorption was diagnosed in this case, due to the trauma and the tooth intrusion without damage in the adjacent tissue.

When a root resorption is established in association to infection into the root canal, the resorption can progress as an inflammatory condition if it is not treated, spreading throughout the whole root [3]. This inflammatory resorption is usually asymptomatic, so, many patients only seek for treatment when it is in advanced stage [12] as the case reported in this study, where the patient requested treatment only after 1 year of the trauma.

In attempt to overcome this situation, it is necessary to perform a root canal disinfection associated to an alkaline intracanal medication, usually a calcium hydroxide-based paste [6, 13]. In the present study, the insertion of a calcium hydroxide-based paste associated to camphorated paramonochlorophenol into the root canal was chosen as the intracanal medication to increase the antimicrobial spectrum and interrupting the root resorption process. The case report, the healing could be assessed by control radiographs showing a calcified tissue formation in the apical radicular third and also the replacement of cementum and periodontal ligament.

The MTA was placed into the root canal as the obturation material. This decision was based on the great extension of the apical resorption that shorten root length in association to the incomplete apical closure [9,15]. Another reason for its option refers to the attempt of sealing all the root canal with a biocompatible material. MTA filling may also contribute in the release of calcium ions through dentinal tubules into resorption defects, which may favor the repair potential of the surrounding tissues [1].

In this context, the concept of regenerative endodontic therapy may also be a potential alternative in the management of traumatized immature necrotic teeth [1,11,16]. Although pulp revascularization presents a promising therapy, in this study the instrumentation and disinfection endodontic associated with MTA sealing healed the periapical area remodeling bone and supporting tissues and also paralyzed the resorption process. So far, the treatment performed may considered successful in the 4-year follow-up revealing that the tooth remains free of signs and symptoms and completely functional.

Conclusion

The 4-year follow-up demonstrated the healing of the periapical and periodontal tissues, as well as the stabilization of the external root resorption**.** Root resorption is a frequent sequela of dental trauma, therefore, all therapeutic efforts must be directed towards the maintenance of the tooth in order to maintain its normal functions. As we saw in the case described, endodontic therapy on a tooth with internal and external resorption, after suffering intrusive dislocation and coronary fracture, can be effectively performed with the use of MTA, allowing the repair of the region and stabilization of resorption. In addition, good monitoring is essential to establish successful treatment.

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