

Removal of a nail into the root canal: case report

Remoção de um prego no interior do canal radicular: relato de caso

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Abstract

A great variety of metallic objects broken by dentist or even by the patients have been discovered in root canal. Some of these foreign objects present difficulties to be removed with minimal loss of dentinal structure. This case report describes a rare clinical case in which a nail, inserted by the patient inside root canal, was removed through non-surgical approach. In order to remove the nail of an immature maxillary right central incisor of a 12-years-old boy were used ultrasonic tips and interlaced K-files. The surgical microscopic was used as an auxiliary on the magnification of the vision field. After removed the nail, the space of the canal was filled with calcium hydroxide and a week past, the obturation with gutta-percha was performed and the tooth received an aesthetic restoration. A foreign object inside root canal, especially, when was already cleaned and shaped has presented a little greater difficulty. Once the root canal taper has showed similarities with the nail taper, which was trapped between the walls of the canal. The technique employed was able to preserve the dental structure without the necessity of a surgical approach in a tooth that before had suffered an injury due to a dental trauma.

Descriptors: Tooth injuries; Foreign bodies; Root canal therapy

Resumo

Uma grande variedade de objetos metálicos quebrados pelo cirurgião-dentista ou mesmo pelos pacientes tem sido encontrados no interior dos canais radiculares. Alguns desses objetos apresentam dificuldades para serem removidos, com destruição mínima da estrutura dentária. Este relato descreve um caso clínico não usual, no qual um prego foi inserido pelo paciente e removido através de uma intervenção não cirúrgica. Com intuito de remover o prego do interior do canal radicular do incisivo central superior direito de um garoto de 12 anos, foram utilizadas pontas ultrassônicas e limas tipo K trançadas. O microscópio cirúrgico foi utilizado como uma ferramenta auxiliar, magnificando o campo de visão. Após removido o prego, o espaço do canal foi preenchido com hidróxido de cálcio e passada uma semana, foi obturado com guta-percha e restaurado esteticamente. Objetos "estranhos" no interior dos canais, especialmente quando já limpos e preparados apresentam uma maior dificuldade para serem removidos, uma vez que a forma do canal apresenta similaridades com a forma do prego, este que estava preso entre as paredes. A técnica empregada foi capaz de preservar a estrutura dentária sem a necessidade de intervenção cirúrgica em um dente que antes já tinha sofrido uma injúria devido a um traumatismo dentário.

Descritores: Traumatismos dentários; Corpos estranhos; Tratamento do canal radicular

Introduction

The objective of endodontic treatment is to render the affected tooth biologically acceptable, in other words, this means that the tooth should be functional, without symptoms or signals of pathosis.

When the tooth in question is an immature maxillary anterior traumatized tooth, the necrosis of the pulp can arrest root development and apical periodontitis may result from trauma. This can lead also to a serious long-term implications especially such teeth treated with calcium hydroxide, which may ultimately fracture and be lost to the dentition¹⁻².

An important step is to prepare the root canal biomechanically, however during this stage various endodontic instruments used inside the root canal can fracture and a fragment may become trapped within the canals³. Root canals can be blocked by the presence of broken instruments, canal obturation materials and in some case by foreign objects inserted by the own patients⁴.

No standardized procedure for successful removal of unusual metallic objects even in difficult cases exists, but a number of different techniques are recommended, such as: the use of Stieglitz pliers to remove silver points as well as a small mosquito hemostat to remove silver cones, ultrasonic instrument to remove a broken bur tip^{3,5-6}. This case report describes a rare clinical case of a nail, inserted by the patient inside root canal, and its remotion through non-surgical approach.

Case report

A 12-years-old boy was carried to the Dental Traumatology Center (CADE-Trauma/FOUSP) because of an injury on enamel and dentine with pulpal involvement in the right maxillary central incisor, which had occurred about 2 months ago. The patient was asymptomatic, with pulpal necrosis as well as with periapical lesion around the apex (Figure 1).

In the first appointment, the root canal was cleaned and shaped, and the calcium hydroxide was used as an intracanal medication to fill the empty canal space. The Cimpat[®] was used to close the entrance of endodontic access and the tooth restoration was performed.

When re-called, a month later, was observed that the resin restoration had been lost and a little bit down from the resin line could be seen a minimal loss of dentinal structure. The tooth was cleaned, filled with calcium hydroxide and blocked with Cimpat[®] again, but no restoration was done and the patient was warned to back in 2 weeks, in order to obturate the root canal.

In the following appointment, during the intraoral inspection was observed in the entrance of the root canal a metallic sphere and so, an X-ray was taken. This exam demonstrated the presence of a nail inside the root canal, which was inserted by the patient, "like a curiosity" as he told (Figures 2 and 3).

The surgical microscopy was used as a tool to amplify the vision field, because first of all, was tried to pull the nail with the fine tip of an explorer instrument, but the remotion failure. Thus, the Start-X[™] ultrasonic tip #1 was used to open a space between the nail and the dentin wall, and after that was placed a K-file #20 between the nail and the wall of the root canal and also, more two K-files #20 and #15 were placed in the same way and then, the three K-files were interlaced and pulled out to the canal⁷. Other ultrasonic tip, Start-X[™] #3, was applied on the files to assist in the removal of the nail. The procedure with the three K-files was done twice more until, finally, the nail came imprisoned for K-files (Figure 4).

The internal crown face, as well as the calcium hydroxide waste in the apical third was cleaned with sodium hypochlorite, the root canal was aspirated, dried with paper points, filled with calcium hydroxide and the canal entrance was closed with glass ionomer. A week later, the canal was filled with gutta-percha by lateral and apical condensation technique and the tooth was restored (Figure 5).



Figure 1. Dental injury in the right maxillary central incisor with periapical lesion



Figure 2. The presence of a nail inside the root canal, by periapical X-ray

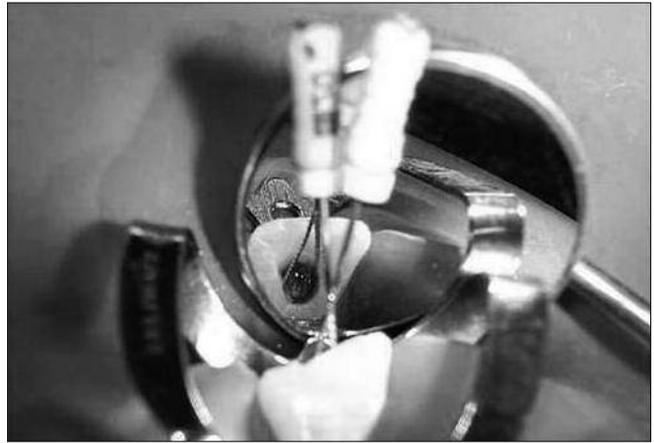


Figure 3. Three K-files interlaced with the nail



Figure 4. Root canal obturation

Discussion

One of the most troublesome incidents is the fracture of endodontic instruments within root canal. Many objects have been reported to break and subsequently become lodged in root canals. Nails, pencil leads, toothpicks, tomato seeds, hat pins, needles, pins and other metallic objects, were listed in 1987 by Chenail and Teplitsky⁸.

Technical equipment should not be considered the only factor influencing success or failure of removal procedures. The experience and skill of the operator as well as the anatomical factors are important, although the removal of foreign objects sometimes is difficult and the success rate has been reported as 55% to 79%⁹.

Many methods are describes to remove broken instruments or objects within root canals, such as hand instrumentation, ultrasonic devices, Masserann Kit, canal finder system or, sometimes surgical methods also are employed¹⁰.

The technique is similar to remove objects placed within root canal by the patient. In all cases, a careful examination with fine endodontic instrument should be the first step. Initially, the attempt was to remove the foreign body with a fine tip explorer, but it was not possible. It seems that this was because the nail had size compatible with the canal wall, which had been instrumented and had conical shape.

In order to observe in a high magnification, the microscope was used as an auxiliary tool. In general, this tool is used for the location of the MB-2, where it is reported a greater ability to do so¹¹ and most recently, Gencoglu and Helvacioğlu¹² (2009) concluded that visualization of an operative microscope influence the success of the fractured instrument management. In this way, it was possible to observe a gap between the nail and the wall of the canal however, K-file #15 could not be inserted, and for this were used the ultrasonic tips.

First, the Start-X™ #1, which is indicated for wall refinement and then, the tip #3, originally indicated, for canal openings scouter, but in this case was used on the K-files in order to move the nail by vibration and also, because the intention was to do the less harm in the dentin structure, since it was a traumatized tooth.

Start-X™ #4, indicated to remove metal points, was not used on the nail directly because the head of the nail was located deeply and stuck in the entrance hole. So, it was necessary to use three K-files, which were interlaced and pulled removing the nail.

During the first appointment was observed in X-ray a periapical lesion around the root apex. After performed the biomechanical preparation, the main root canal was totally filling with calcium hydroxide for a month and also again, for more 2 weeks, because the Cimpat® had fallen and the canal was exposed to the oral environment, and that was the moment when the nail was inserted.

Interestingly, when the nail was found within the root canal, the periapical X-ray showed no lesion anymore which guarantee that the previous endodontic treatment had been well performed and, hypothetically, the nail protected the calcium hydroxide in the apical third to be soluble, as observed in Figure 3.

Conclusion

A foreign body can be removed through K-files interlaced and it is able to preserve the dental structure, however this kind of procedure depends of the operator experience and also of what and where metallic objects are found. Microscopy and ultrasonic tips are used as auxiliary tools, increasing the chance of removal and ensuring the integrity of the tooth structure.

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