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NON-SURGICAL TREATMENT OF A TRAUMATIZED TOOTH WITH PERIAPICAL INJURY AND IMMATURE APICE USING MTA AS AN APICAL BARRIER: A CASE REPORT

Selena Gómez de la Garza[1], Violeta Cecilia Tinoco Cabriales[2], Juan Alberto Hernández Castillo[2], Bertha Luna García[2], Claudia Penélope Mora López[2], & Mario Alberto Palomares Rodriguez[2]

[1]Graduate in Endodontic Master Degree, M.D, of the Dentistry Faculty, Autonomous University of Tamaulipas.

[2]Professor of the Dentistry Faculty, Autonomous University of Tamaulipas.

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ABSTRACT

A clinical case is described of a 17-year-old patient who suffered a trauma at the age of 8, compromising the upper right incisor, which prevented complete apical closure and the presence of a periapical lesion. The patient reports having interrupted the root canal treatment one year ago, in the diagnostic periapical radiograph the endodontic treatment already started is confirmed and temporary crown filling material is observed, the presence perhaps of calcium hydroxide inside the root canal, incomplete apical formation and a periapical radiolucent lesion. Root canal treatment was resumed using K-type manual files until reaching a #140 apical caliber, 5.25% sodium hypochlorite was used as irrigant, Ultrapex (Ca(OH)2 + Iodoform) was placed as intracanal medication for several months. Two years after resuming treatment, the patient was asymptomatic, and in the control periapical radiograph it was possible to observe the considerable decrease in the periapical lesion, therefore it was decided to obturate using the classic lateral condensation technique, AH Plus sealant and previous at this stage, 4mm of MTA was placed as an apical barrier.

Conclusions

The importance of using intracanal medication in situations of dental necrosis with a periapical lesion of considerable size is shown through this clinical case. This case was caused due to dental trauma which, as we know, can evolve in very different ways and in many situations the dental prognosis ends up being very unfavorable. In addition, because it is an immature apex, the

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use of an MTA apical barrier was essential for containing the filling materials to avoid their extrusion into the periapical tissues and ensuring a better sealing in the apical third.

Keywords: Classical Lateral Condensation, Periapical Lesion, Trauma, Ultrapex.

INTRODUCTION

Dental trauma comes in myriad forms and individual characteristics. The wide spectrum of injury patterns is a consequence of the many possible combinations of damage to the gingiva, dental hard tissues, pulp, periodontium, and alveolar bone (Andreasen et al., 2018). Dental trauma is problematic, especially in children, where development of the teeth and the growth of the jaw bones are incomplete, which can complicate the appropriate therapies (Mediero et al., 2018).

Home and school are places where traumatic experiences often occur dental injuries. It has been shown that the place of injury was related to gender, that is, the most frequent place of injury for boys was school, followed by home, while for girls this was the other way around (Bendo et al., 2010) (Noori et al., 2009) (Fakhruddin et al., 2008).

It is estimated that trauma affects one billion people worldwide (Petti et al., 2018), and one third of these patients have lesions in immature teeth that could cause pulpal necrosis (Hecova et al., 2010).

A great deal of effort has been made in recent years to find alternatives to conventional endodontic treatment, as it does not lead to increased root formation, leaving the tooth susceptible to root fracture and possibly loss of the entire tooth. In addition, the most serious sequelae of early extraction are the loss of volume of the alveolar process, which makes planning future prosthetic treatment difficult. The problem is that the open apices of traumatized immature teeth make it difficult to perform an adequate root filling without intraoperative complications, such as extrusion of the filling material into the periapical tissue or overfilling (Trope, 2010).

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Fig. 1: Upper right central incisor with slight color change.

MTA can induce closure of the immature apex or create a 3-mm apical barrier in the apical third could be another rational application of this material. It is a bioactive material that does not irritate periapical tissues and stimulates cementitious tissue regeneration (Pitt Fordet al., 1995).

Studies have shown that MTA induces apexogenesis by stimulating mesenchymal stem cells of the apical papilla to encourage complete root formation in open apices (Huang et al.,2008).

CASE REPORT

A 17-year-old patient presented to resume endodontic treatment that he had suspended a year earlier. During the interrogation, he reported having suffered dental trauma at 8 years of age, which caused a fracture of the incisal third of the upper right central incisor, reason for which years later he sought dental attention since he began to present a change in coloration, no fistula or other relevant clinical data was found (Fig. 1).

The diagnostic periapical X-ray confirms the endodontic treatment started a year ago, temporary cement is observed at the coronal level, it is not possible to observe the root canal in its entire length, perhaps due to the presence of calcium hydroxide that could have been placed anteriorly and at the apical level, an immature apex and a periapical radiolucent image are observed (Fig. 2).

The patient is suggested to resume conventional endodontic treatment and is warned of the possibility of requiring endodontic surgery at some point, considering the size of the periapical lesion.

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Fig. 2: Diagnostic periapical radiograph.

In the first appointment, the temporary cement is removed and the presence of calcium hydroxide inside the root canal is confirmed, an inverted instrumentation technique is used to eliminate the remains of this, it is irrigated with 10 ml of sodium hypochlorite at 5.25%, it is establishing the actual working length until reaching an apical gauge # 140.

Using another 10 ml of 5.25% sodium hypochlorite and 17% EDTA for 1 minute. The patient is prescribed 600 mg of ibuprofen every 8 hours for 5 days and is warned of the possibility of exacerbation.

For the second appointment, a week later, the patient reports not having presented significant pain, therefore, the treatment is continued, due to the size of the apical lesion and the time the patient had after suspending the previous treatment, Ultrapex was placed (Ca (OH)2 + Iodoform) as an intracanal medication, the placement of the medication was confirmed by means of a periapical X-ray with the aid of an RVG Dentsply Sirona Supreme and an appointment was made in three weeks (Fig.3).

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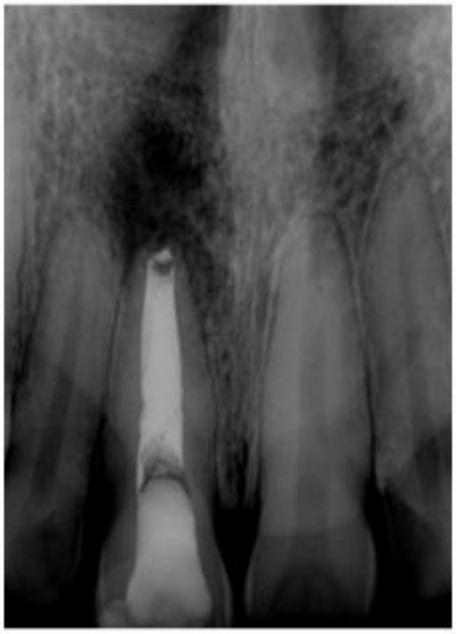

Fig. 3: Ultrapex placement

The patient stopped attending his consultation approximately 1 and a half years after restarting the treatment because of the social restrictions and healthy distance generated by the COVID-19 pandemic. In the new clinical reassessment, the leaked temporary cement was detected and in the radiographic examination shows internal resorption of the cervical third of the canal compatible with caries, part of the Ultrapex resorbed, and a considerable decrease in the periapical radiolucent lesion is detected (Fig. 4). In this appointment, only the Ultrapex present within the middle and apical third is removed. of the canal, the working length is confirmed and irrigated with 10 ml of 5.25% sodium hypochlorite and 17% EDTA for 1 minute.

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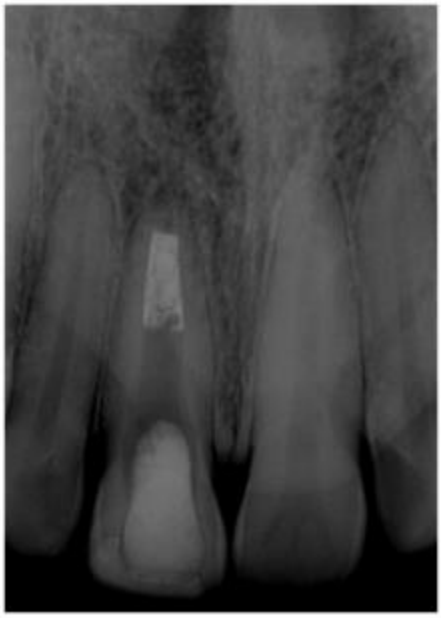

Fig. 4: Mild cervical internal resorption of the root canal and decreased periapical lesion.

One week later, the treatment was sealed. The patient was asymptomatic, did not present a bad odor or exudate inside the root canal. An apical barrier of MTA was placed in the apical 4mm of the canal through the immature apex using MTA REPAIR HP Angelus. This was brought into the canal with an MTA Angelus applicator and compacted apically with a Schilder # 11. A periapical radiograph was taken using the Sirona Supreme digital sensor to confirm that the material was placed 4mm apically (Fig. 5), 15 minutes after it had been removed. the MTA hardened, a gutta-percha cone was prefabricated with the help of a caliper and the entire canal was filled using the classic lateral condensation technique and Ah plus sealing cement, the quality of the filling was verified with a final X-ray (Fig. 6).

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Fig. 5: MTA apical barrier, 4 mm.

Fig. 6: Final obturation x-ray.

Six months after the end of the treatment, a follow-up appointment was made, finding the patient asymptomatic and the periapical radiograph showing the disappearance of periapical lesion (Fig. 7).

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Fig. 7: Control X-ray after 6 months.

DISCUSSION

Performing an endodontic treatment on a previously traumatized tooth and with incomplete root formation entails a very significant degree of difficulty, both during instrumentation, irrigation, and the periapical tissues, as well as during obturation due to the impossibility of ensure that the materials used in this stage remain within the limits of the root canal causing an inflammatory reaction.

This case was a great challenge because treatment was interrupted due to the health emergency that arose from COVID-19 and the great risk of a potential reinfection of the root canal for the months that the patient interrupted treatment.

The difficulty in eliminating the remaining microorganisms within the root canal and dentinal tubules, even with abundant irrigation and mechanical procedures, makes the use of intracanal medication essential (Manzur et al., 2007). Calcium hydroxide is the intracanal medication most widely used due to its antimicrobial activity and its high pH, which can generate in between. This alkaline medium is important, since it considerably reduces the number of microorganisms, dissolves organic tissue, inactivates endotoxins, and prevents root resorption (Zmener et al., 2007).

There are different bioceramic materials that are used, among other things, as apical barriers within the root canal in cases of immature apices. At the beginning of 1994, with the introduction

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of MTA by Torabinejad, this product was promoted for the use of direct encapsulations, pulpotomies, and perforation sealing. of the root canal, which is why it has long been the ideal material for apexification therapy due to its excellent biocompatibility and great sealing capacity (Torabinejad et al., 2010). MTA is a bioactive cement with the ability to induce the formation of new cementum and periodontal ligament, which makes this material biologically acceptable for the closure of a canal with an open apex (Bakland et al., 2012).

CONCLUSION

The importance of using intracanal medication in situations of dental necrosis with a periapical lesion of considerable size is shown through this clinical case.

This case was caused due to dental trauma which, as we know, can evolve in very different ways and in many situations the dental prognosis ends up being very unfavorable.

In addition, because it is an immature apex, the use of an MTA apical barrier was essential for containing the filling materials to avoid their extrusion into the periapical tissues and ensuring a better sealing in the apical third.

However, many cases could fail in the mid or long term due to trauma and its evolution, therefore is fundamental to give a proper clinical and radiological control following for at least 5 years after concluding the treatment.

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