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Endodontic Treatment of a Deducted Lower Molar with Forca Injury, Root Reabsortion and Permanent Premolar Agenesis – Clinical Case Study

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***Keywords*— Pulp and periapical tissue diseases. Periradicular abscess without fistula. Pathological resorption of teeth.**

***Abstract*—** *When the pathological process affects the dental pulp of the deciduous dental element and causes pulp inflammation or infection, endodontic treatment is indicated. The maintenance of the primary tooth is important, especially in cases of permanent tooth agenesis. The aim of this study is to report a clinical case about the endodontic treatment of a deciduous lower molar with furcation lesion, root resorption and permanent premolar agenesis. A patient was selected at the dental clinic of FAPAC/ITPAC (Porto Nacional) – TO, asymptomatic, negative sensitivity test and vertical percussion, incomplete root formation, radiolucent area in the furcation region in a deciduous lower molar and root resorption. In the first session, anesthesia, access surgery, absolute isolation, irrigation with 2.5% sodium hypochlorite, odontometry, instrumentation with K-files at working length, drying and insertion of intracanal medication (calcium hydroxide) were performed. In the second session (after 15 days), the intracanal medication was removed and the root canals were filled with mineral trioxide aggregate (MTA). Through the results obtained with the endodontic treatment, regression of the pathological process was noted during the proservations and the patient had no symptoms. Endodontic treatment in a primary first molar with a diagnosis of acute periradicular abscess is feasible for the conservation of the primary tooth. In this way, the absent permanent dental element performs its functions.*

I. INTRODUCTION

The process of formation of an individual's tooth germs still occurs during the intrauterine phase of an embryo. Disorders or alterations in the phases of odontogenesis can result in the absence of deciduous or permanent dental elements, a process defined as tooth agenesis (COHEN; HARGREAVES, 2011).

In the literature, tooth agenesis is named based on the number of missing teeth, which can be partial, such as hypodontia (absence of up to 6 elements), oligodontia (absence of 6 or more elements) or total, which is called anodontia. The early diagnosis of these oral alterations is extremely important, so that the professional can establish treatment possibilities for that patient. The maintenance of a deciduous tooth in case of agenesis of its successor is an option, because if it is lost, the alveolar bone will be preserved for replacement by the implant, if the patient presents satisfactory facial growth (RIBA, 2014).

Deciduous teeth, as well as permanent teeth, play a fundamental role in maintaining the oral cavity. Beraldini

et al., (2020) describe the involvement of early childhood caries in approximately 600 million children worldwide.

Caries is a multifactorial disease; its evolution can lead to periapical lesions with the presence of fistula through the dissemination of bacteria. This occurs due to its progression to the pulp level (MACHADO et al., 2010).

Aiming to preserve the dental element to prevent its premature loss, whether due to dental caries or trauma, pulp therapy in primary teeth is a conservative technique widely used in pediatric dentistry. Through the diagnosis of the pulp condition, clinical and radiographic examinations, we will have the best indication of treatment choice, thus conserving the function, mastication, phonetics, and aesthetics of that tooth (NETO et al., 2013).

According to some studies, the dental surgeon needs to consider their indications and contraindications for endodontic treatment in primary teeth. It is necessary that the dental element presents half of 2/3 of the root, bone crest present and conditions for instrumentation. Its infeasibility may be due to root resorption, lack of integrity of the crypt of the permanent germ and impossibility of absolute isolation (COHEN; HARGREAVES, 2011).

In addition, the success of endodontic treatment also depends on an organic response from the patient, on the total removal of necrotic tissue, and mainly, on the action of the drug of choice placed inside the canals. Periodic follow-up is of paramount importance to ascertain whether the procedure was successful (MELLO-MOURA et al., 2013).

Thus, the aim of this study was to present a case report of an endodontic treatment of a deciduous lower molar with a furcation lesion, root resorption and permanent premolar agenesis.

II. METHODOLOGY

This work is a basic, qualitative, and descriptive study of a clinical case report.

A 16-year-old male patient came to the dental clinic at Fapac/Itpac – Porto Nacional for evaluation, complaining of pain when chewing in the element 74. In the visual inspection, it was possible to observe a bulging in the furcation region (Figure 01), suggesting the installation of infectious process. A vertical percussion test (negative) was performed with the mirror handle and a cold sensitivity test with Endo-ice (Maquira dental, Maringá - PR) (negative). A periapical radiograph was performed, and it was found the presence of a periradicular abscess in the furcation region of the dental element and a process of mesial root resorption in dental element 74 and agenesis of the second permanent premolar (Figure - 02).

Fig.1 - Bulging in the furcation region

Source: Own Author

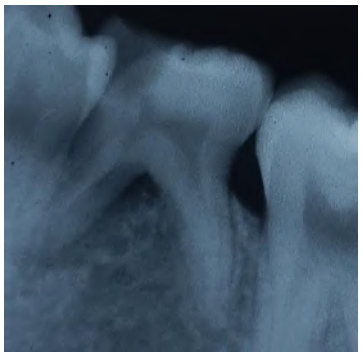

Fig.2: Initial radiograph - periradicular abscess in the furcation region of the dental element and mesial root resorption process in dental element 74 and agenesis of the second permanent premolar

Source: Own Author

Subsequently, the patient was informed about the technique of endodontic treatment and after signing the informed consent, the treatment will be carried out in two sessions following the following protocol:

1st session

Anesthesia was applied with Lidocaine 1:200000 (Dentsply/Sirona, Ballaigues - Switzerland). Subsequently, prophylaxis of the tooth will be performed with a straight white CA Brush (Microdont, Socorro - SP) and Herjos prophylaxis paste (Vigodent, Rio de Janeiro - RJ) and coronal opening with drills 1014 and 3082 (KG Sorensen, Barueri - SP).

Absolute isolation was carried out with a rubber sheet (Madeitex, São José dos Campos - SP), Ostby isolation arch (Prisma, São Paulo - SP) and a mixed isolation clamp (KSK, Rio de Janeiro - RJ) disinfection of the operative field. with 0.2% chlorhexidine (A Formula Manipulation Pharmacy, São Paulo - SP).

Initial exploration with K file # 10 (Dentsply/Sirona, Ballaigues - Switzerland) was carried out until it was perceived to have reached the apical region of

the tooth element. Subsequently, the preparation of the cervical third will be carried out with K-type hand files compatible with the diameter of the dental element.

During the entire instrumentation, irrigation was performed with 2.5% sodium hypochlorite (Pharmacy of manipulation - Formula and Action - São Paulo - SP), through a plastic syringe Lüer Slip 10 mL (Advantive, Nanchanc Jangxi - China) and needle disposable 25 x 0.55 (BD, Curitiba - PR). 30 mL of solution will be used per experimental unit.

The root canal, at the end of the preparation, was dried with capillary tips (Ultradent Products, Inc, South Jordan, Utah, USA) attached to a high-power sucker and with absorbent paper cones (Tanari, Manacapuru - AM). Soon after, the intracanal medication, calcium hydroxide (Calen, SSWhite, Ballaigues – Switzerland), will be inserted with the aid of a number 40 lentulo and the coronary sealing with glass ionomer.

2nd Session (The second session was held shortly after 15 days)

Normality was observed in the periodontal tissues in the visual inspection (Figure - 03).

Fig.3: Normality in periodontal tissues in visual inspection

Source: Own Author

Anesthesia was applied with Lidocaine 1:200,000 (Dentsply/Sirona, Ballaigues - Switzerland) and coronary opening with drills 1014 and 3082 (KG Sorensen, Barueri - SP), absolute isolation, irrigation with 2% chlorhexidine gel and saline (Manipulation Pharmacy). – Formula e Ação – São Paulo – SP), using a 10 mL Lüer Slip plastic syringe (Advantive, Nanchanc Jangxi - China) and a 25 x 0.55 disposable needle (BD, Curitiba - PR) and hand files compatible with the cervical third of the dental element, for removal of intracanal medication.

The root canal, at the end of the preparation, was dried with capillary tips (Ultradent Products, Inc, South Jordan, Utah, USA) attached to a high-power sucker and with absorbent paper cones (Tanari, Manacapuru - AM).

The final irrigation was performed with 3 mL of 17% EDTA (Ethylenediaminetetraacetic acid) (Pharmacy of manipulation – Formula e Ação – São Paulo – SP). First, 1 mL of 17% EDTA was introduced followed by ultrasonic vibration with a 25 IRRI S insert (VDW; Endo Ultrasonic Files, Endodontic Synergy, Munich, Germany) at a frequency of 30 kHz. The ultrasound insert was connected to a piezoelectric ultrasound operating at 30 kHz (CVDent 1000; CVD Vale, São José dos Campos, SP, Brazil), set at power level 3, for a period of 20 s. This process was repeated 2 more times. After this process, irrigation will be performed with 5 mL of 2% chlorhexidine gel and saline solution (Farmácia Formula & Ação, São Paulo - SP. The canal was dried with capillary tips (Ultradent Products, Inc, South Jordan, Utah, USA). coupled to a high-power suction device and with absorbent paper cones (Tanari, Manacapuru - AM).

The filling was performed with mineral trioxide aggregate (MTA) in the mesial root and the distal root was filled with gutta percha cones and AH plus cement. The definitive restoration with composite resin was performed after the treatment and the final radiography will be performed with a radiographic positioner (Indusbello, Londrina - PR). The dental element was maintained at 1 month (figure 04) and 7 months (figure 05), analyzing the regression of the pathology and symptoms. Regression of the pathological process and absence of symptoms were observed during the follow-ups.

Fig.4: 1 month follow-up

Source: Own Author

Fig.5: 1 month follow-up

Source: Own Author

III. DISCUSSION

The case presented is classified as a deciduous tooth maintenance procedure due to agenesis of its permanent successor dental element through endodontic therapy. Tooth agenesis is a common health problem, which is mainly related to hereditary factors. This is due to mutations or changes in genes related to missing teeth. Other causes have been highlighted through some studies, among them we have infectious, traumatic, nutritional factors and even changes in evolution (FERREIRA; FRANZIN, 2014).

Among the problems associated with agenesis, we can mention the loss of masticatory function, malocclusions, resorption of alveolar processes and phonetic and aesthetic problems. Thus, constituting problems beyond the dental that affect the life of the individual in society. Currently, there are several types of treatment for the absence or loss of a dental element. All have the objective of conserving the alveolar bone and the function of the tooth, however, it must be analyzed through a good diagnosis which is the most viable for each case (FERREIRA; FRANZIN, 2014).

The two main resolutions for agenesis are orthodontic treatment or prosthesis. Orthodontic treatment consists of mesializing the posterior teeth or creating an opening for placement of a prosthesis, implant or autotransplant. The maintenance of primary teeth through endodontic treatment is also a viable technique that consists of preserving the dental element in the cavity and maintaining its function. Therefore, it is up to the dental surgeon to inform the patient about the risks and benefits of these treatments (FERREIRA; FRANZIN, 2014).

Bjerklin and Bennett (2000) carried out a study with 41 individuals, 13 men and 28 women, with agenesis of one or two lower premolars and with the deciduous first molar still retained. The objective of this study was to carry out maintenance of the deciduous tooth and to judge the resorption of the roots, where it was concluded for some years that there was slow root resorption and infra-occlusion of 55% of the elements. This work presents good statistics for the present study.

Bjerklin et al., (2008), stated through a study with 99 individuals that there was some distalization of the premolar and permanent molar next to the deciduous first molar and that it is in infraocclusion with some years. After endodontic treatment, only 2 elements that were treated were lost, which is a great margin for a conservative procedure in case of permanent premolar agenesis.

MTA cement is a composite endodontic repair material. Its biocompatible nature allows it to have the ability to form hydroxyapatite when exposed to saline solutions, provide better microleakage protection than traditional endodontic repair materials, and promote antimicrobial activity. Roberts et al (2008) carried out a survey with 156 articles and cases regarding the properties, compositions and clinical results of MTA and found that the present material showed great biocompatibility and excellent potential for endodontic use. However, they cautioned that more study is needed in this underexplored area.

Morita et al (2021), performed a comparative study where the main objective of this research was to examine the antibacterial effects and mineral inducing abilities of three conventional MTA cements and one resin-modified MTA cement. In the end, they concluded that none of the cements inhibited bacterial growth. Furthermore, the resin-modified MTA cement showed lower mineral induction capacity compared to the three conventional MTA cements, including the one used in the present work.

Inadequate treatment of endodontic infections in primary teeth results in the loss of a primary tooth or abnormality in the development of hard dental tissues of the permanent successor. The main objective is to maintain the integrity and health of the primary tooth until its physiological exfoliation. The success of endodontic treatment depends on the antimicrobial activity of the root canal filling material that contributes to the elimination or reduction of microbial infection of the root canal system. According to Shindova (2021), knowledge of the composition and characteristics of available filling materials is a useful advantage for dentists to solve the functional problems associated with endodontic infections in very young patients.

Root canal therapy of primary teeth requires perfect instrumentation, disinfection, and filling of root canals to eliminate infection, control inflammation, relieve pain, prevent pathological effects on inherited permanent tooth and prolong preservation of primary tooth. Thus, it is necessary to know about the anatomical morphology, preparation, disinfection and filling of the root canal and application of antibiotics (YU; ZHOU; ZHENG, 2020).

Acute periradicular abscess is a pathological process where microorganism from the infected root canal resulted in an inflammatory reaction called periapical lesion. Thus, seeking to relate the participation of the immune system in periradicular lesions in deciduous teeth and the immaturity of the child's immune system, Bolan (2007) carried out a survey with 14 primary dental elements with periradicular lesions, where he identified the presence

of T lymphocytes and B and macrophages. This study is relevant for the understanding of this pathological process, because through the knowledge of the cells present, materials and biocompatible methods can be obtained for this specific case.

Noorollahian (2008) carried out a comparative study between Buckley's formocresol and MTA. The author aimed to analyze the real advantages and actions in the body of these materials in case of pulpotomy in cariously exposed primary molars. Sixty primary molars from 46 children were selected, treated in conventional ways, and randomly assigned to the MTA (experimental) and CF (control) groups by a random numbered table. This study concluded that MTA can be used as a safe drug for pulpotomy in cariously exposed primary molars and can be a substitute for CF.

In this way, through several studies, the best knowledge about dental development allowed us to obtain conservative materials and methods that seek to be as biocompatible as possible, helping in the process of natural tooth repair (NETO, 2013). Endodontics in the children's clinic has great relevance, its conservative therapy allows us to keep a dental element for the necessary time in the child's dental arch, thus reducing the possible problems associated with the early loss of a deciduous dental element.

IV. CONCLUSION

Endodontic treatment in a primary first molar with a diagnosis of acute periradicular abscess is feasible for the conservation of the primary tooth. In this way, the absent permanent dental element performs its functions.

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