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Endodontic treatment of the lower left deciduous second molar in a patient with oligodontia - case report

Tratamento endodôntico do segundo molar decíduo esquerdo inferior em paciente com oligodontia - relato de caso

Tratamiento endodóntico del segundo molar temporal inferior izquierdo en un paciente con oligodoncia - reporte de caso

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Abstract
The present article is a case study, with a descriptive and qualitative structure, in order to report endodontic treatment in a left deciduous second molar (75) in a patient with oligodontia is reported. After anamnesis and clinical examination, the diagnosis of pulp necrosis was established. Subsequently, the carious tissue was removed with a spherical bur at low speed, the element was isolated, accessed and the chemical-mechanical preparation was carried out with the aid of rotary nickel-titanium files of the Sequence BabyFile system, 2.5% sodium hypochlorite and 17% ethylenediaminetetraacetic acid, using stirring protocol. The filling of the root canal system was performed with iodoformed calcium hydroxide paste, inserted with a lentulo spiral. Patients with oligodontia require multidisciplinary follow-up and endodontic treatment of deciduous teeth, especially when necrotic, avoids early extractions and, in the absence of a permanent successor, has great value in the treatment plan, aiming at maintaining space and alveolar bone, anchoring orthodontic devices and prevent extrusion of antagonistic elements.
Keywords: Tooth deciduous; Endodontics; Oligodontia; Root canal preparation.

Resumo
O presente artigo é um estudo de caso, com estrutura descritiva e qualitativa, com objetivo de relatar o tratamento endodôntico em um segundo molar decíduo esquerdo (75), em um paciente com oligodontia. Após anamnese e exame clínico o diagnóstico de necrose pulpar foi estabelecido. Posteriormente o tecido cariado foi removido com broca esférica em baixa rotação, o elemento foi isolado, acessado e o preparo químico-mecânico foi realizado com auxílio de limas de níquel-titânio rotatórias do sistema Sequence BabyFile, hipoclorito de sódio a 2,5% e ácido etilenodiamino tetra-acético a 17%, utilizando protocolo de agitação. A obturação do sistema de canais radiculares foi realizada com pasta de hidróxido de cálcio iodoformada, inserida com espiral lentulo. Pacientes com oligodontia requerem acompanhamento multidisciplinar e o tratamento endodôntico de dentes decíduos, especialmente quando necrosados, evita extrações precoces e, na ausência do sucessor permanente, tem grande valia do plano de tratamento, visando manutenção de espaço e osso alveolar, ancoragem de dispositivos ortodônticos e impedir extrusão de elementos antagonistas.
Palavras-chave: Dente decíduo; Endodontia; Oligodontia; Preparo de canal radicular.

Resumen
El presente artículo es un estudio de caso, con estructura descriptiva y cualitativa, para informar el tratamiento endodóntico en un segundo molar temporal izquierdo (75), en un paciente con oligodoncia. Tras la anamnesis y exploración clínica se estableció el diagnóstico de necrosis pulpar. Posteriormente se extrajo el tejido cariado con fresa esférica a baja velocidad, se aisló el elemento, se accedió y se realizó la preparación químico-mecánica con ayuda de limas rotatorias de níquel-titanio del sistema Sequence BabyFile, hipoclorito de sodio al 2,5% y Ácido

etilendiaminotetraacético al 17%, utilizando el protocolo de agitación. El relleno del sistema de conductos radiculares se realizó con pasta de hidróxido de calcio yodoformado, insertada con espiral de léntulo. Los pacientes con oligodoncia requieren un seguimiento multidisciplinario y un tratamiento endodóntico de los dientes temporales, especialmente cuando están necróticos, evita extracciones tempranas y, en ausencia de un sucesor permanente, tiene un gran valor en el plan de tratamiento, con el objetivo de mantener el espacio y el hueso alveolar, anclando la ortodoncia. dispositivos y prevenir la extrusión de elementos antagónicos.
Palabras clave: Diente primario; Endodoncia; Oligodoncia; Preparación del conducto radicular.

1. Introduction

Tooth agenesis is the most common developmental anomaly in humans, often presenting a significant clinical problem (Mayra et al., 2022; Williams et al., 2018; Yaun et al., 2017). In the literature, various terminologies have been used to describe the congenital absence of teeth in the primary or permanent dentition (Alnuaimi et al., 2019; Zhou et al., 2021). These anomalies are classified excluding third molars. Hypodontia refers to a condition with one to five missing teeth, patients with six or more missing teeth are classified as having oligodontia; Anodontia is the term given to the complete absence of teeth (raziee et al., 2019).

Oligodontia is a relatively rare condition, probably affecting about 0.1 to 0.2% of the population (Atay, Ozyveren and Serindere, 2020). It can occur as part of a syndrome or as an isolated condition that has been associated with MSX1 and PAX9 mutations and is more associated with females (Ercal & Taysi, 2020). This anomaly has a wide variety of manifestations (Atay, Ozyveren & Serindere, 2020; Creton, et al., 2007). Depending on the number and location of missing teeth, masticatory, speech and aesthetic problems may arise (Cagetti et al., 2019). Different positional changes of teeth, their morphology and size can occur simultaneously with oligodontia (Raziee et al., 2019).

The treatment of these patients is therefore often complex, in addition to loss of function and esthetic impairment, psychological development is an important concern in the oral rehabilitation of growing patients (Zeng et al., 2020). Although oligodontia is a rare congenital disease, treating this abnormality can be challenging (Naishlos et al., 2022; Williams et al., 2021; Zeng et al., 2020). The main objective of management is to improve aesthetics, chewing and speech (Naishlos et al., 2022). Usually, patients with oligodontia require a multidisciplinary treatment, involving endodontists, orthodontists, prosthetists and oral and maxillofacial surgeons, since oligodontia has clinical repercussions that directly influence patients' self-esteem and quality of life (Raziee et al., 2019).

In this context of multiple agenesis of permanent teeth, the maintenance of the deciduous tooth is of vital importance, since it will serve as a space maintainer, preventing the mesialization of neighboring teeth and extrusion of the antagonist, and will act in the maintenance of the alveolar bone (Limeres et al., 2020; Marzouk et al., 2021). The concept of minimally invasive dentistry aims to maintain the vitality of the pulp tissue and all its functions (Chaves et al., 2022; Hanna et al., 2020), but in the face of physical, chemical and, mainly, microbial aggressions, the pulp tissue becomes inflamed as a defense mechanism, and can compromise its vitality if the aggression is not removed or ceases elements with irreversible pulp involvement can only be kept in the oral cavity, free of symptoms, through pulpectomy (Chaves et al., 2022; Priyadarshini et al., 2020).

The success of endodontic treatment is related to adequate chemical-mechanical preparation (Burns et al., 2022). Factors such as the correct removal of infected tissue, reach of irrigating solutions in the apical third and a three-dimensional filling are imperative factors for the disinfection of the root canal system (Burns et al., 2022; Priyadarshini et al., 2020). However, deciduous teeth offer important challenges, such as complex anatomy, changes in the apical foramen due to the physiological process of resorption, thinner dentin, atretic canals, short roots and factors related to the time of the procedure in the face of patient cooperation (Chauhan et al., 2019; Kuo et al., 2006; Priyadarshini et al., 2020).

The purpose of the present work is to report the endodontic treatment of element 75 in a patient with oligodontia. Due to the functional, aesthetic and even psychological changes that it can cause, it is of great importance that the anomaly is identified early, allowing an adequate treatment and prevention plan, leading to the rehabilitation of the patient.

2. Methodology

The present article is a case study, with a descriptive and qualitative structure, where endodontic treatment is reported in element 75, in a patient with oligodontia. Free and Informed Consent and the Free and Informed Consent Term, respectively. The ethical principles described in the Declaration of Helsinki (Resolution 196/96) were respected (ANDRADE et al., 2017). The research is registered under CAAE: 21233145.8.1400.5574/Opinion: 3,859,187.

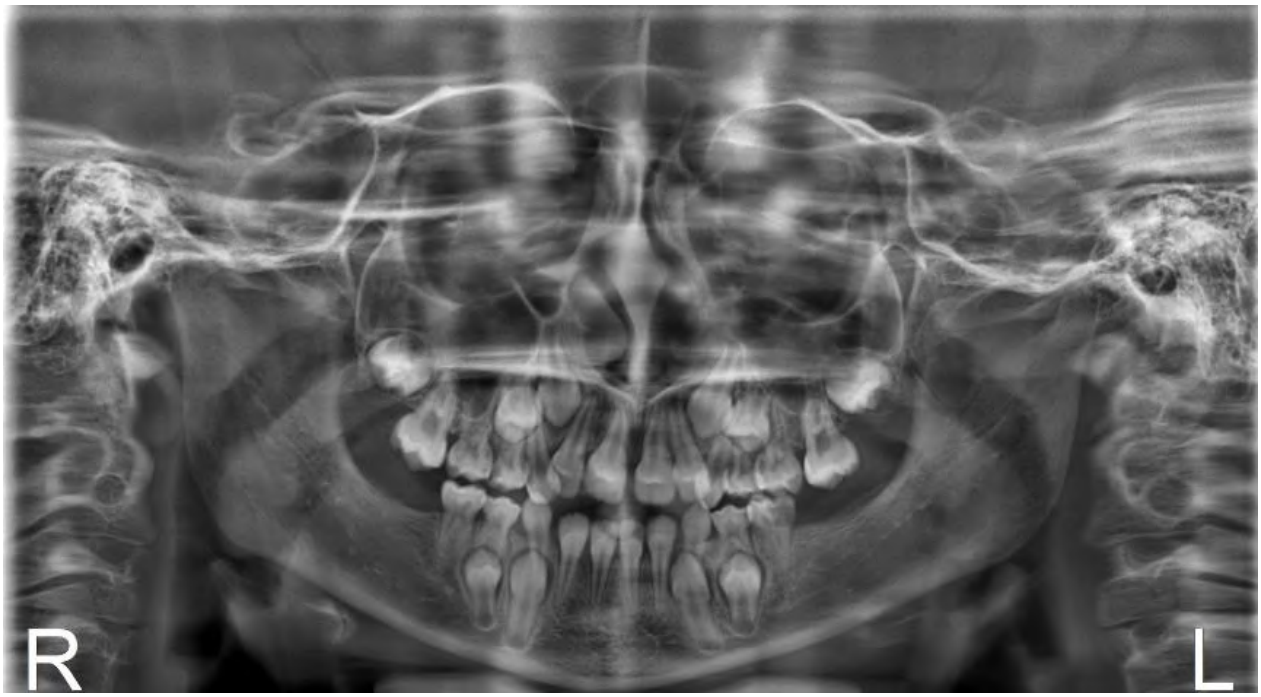
3. Case Report

Female patient, 9 years old, he was referred to a reference dental center accompanied by his guardian for endodontic treatment of element 75. During the anamnesis, the guardian did not report any systemic alteration, but reported a history of multiple agenesis in the child's paternal family.

During clinical evaluation, in element 75, it was possible to observe the presence of extensive carious lesion in the vestibular region and fracture of the distobuccal cusp, without mobility, pain or exudate. It was also informed that the aforementioned element had already presented painful symptoms, but that this discomfort had disappeared days before the consultation.

During radiographic evaluation, it was possible to observe the absence of elements 15, 25, 35, 36, 37, 45, 46 and 47 (Figure 1). At the periapical radiographic examination, it was possible to perceive the intimate relationship between the carious lesion and the pulp horn of element 75 (Figure 2). After testing of cold sensitivity with a negative response, the diagnosis of pulp necrosis was established.

Figure 1 - Panoramic radiography, it is possible to observe multiple agenesis in the maxilla and mandible.



Source: Authors (2022).

Figure 2 - Periapical radiograph. There is an extensive carious lesion close to the pulp tissue.

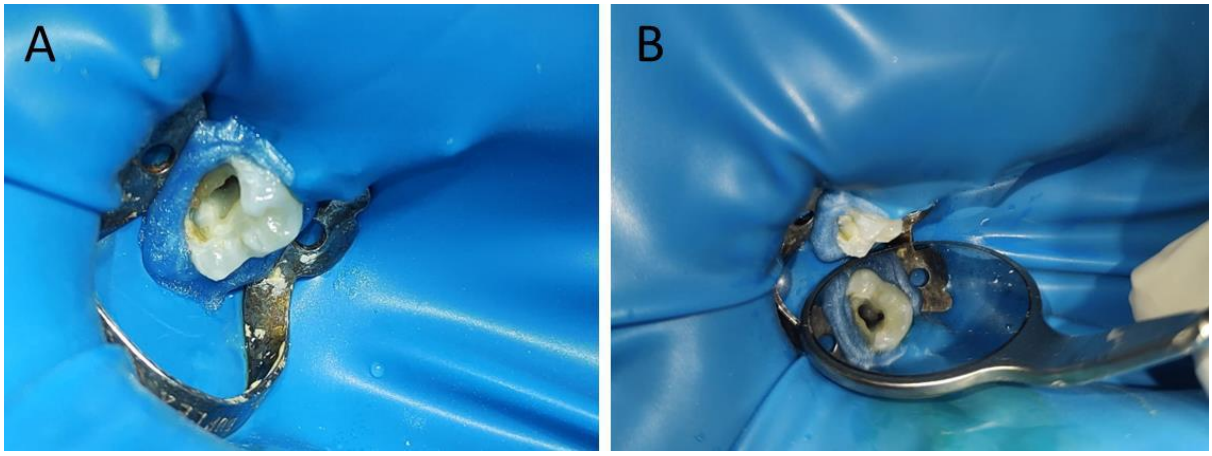
Source: Authors (2022).

Recently, the patient started a multidisciplinary treatment and, therefore, the maintenance of the element in question was considered of vital importance by the other specialists involved. Endodontic treatment was proposed in a single session, the clinical implications of the treatment and the prognosis were explained to the guardian and, after the consent of the guardian and the child, both signed the Free and Informed Consent Term (FICT), respectively and the procedure has started.

The anesthetic technique chosen was the block alveolar nerve, preceded by drying the mucosa and application of topical anesthetic Benzotop® (DFL, Rio de Janeiro, RJ, Brazil) for 2 minutes in order to reduce the painful sensation of needle penetration, using as an anesthetic solution the Lidocaine Hydrochloride 2.0% with Epinephrine 1:100,000 (Alphacaine 100, DFL, Rio de Janeiro, RJ, Brazil). The dental element was isolated with Sanctuary Rubber Sheet (k-dent, Curitiba, PR, Brazil)

and absolute isolation was performed with prior proof of the clamp to be used on the tooth in question, stringing it with dental floss and using a gingival barrier Top Dam® (FGM, Joinville, SC, Brazil) was used to better seal the absolute insulation. The carious tissue was removed with a number 4 spherical Carbide bur (Microdent, Ribeirão Preto, SP) (3).

Figure 2 - Photograph of the clinical appearance after absolute isolation and removal of carious tissue (a). Photograph of the clinical appearance after chemical-mechanical preparation of the root canal system (b).



Source: Authors (2022).

The chemical-mechanical preparation (CMP) was performed with 2.5% sodium hypochlorite (Lenza Farm, Belo Horizonte, MG, Brazil) and Sequence Baby File files (Mk Life, Porto Alegre, RS, Brazil). The mechanized system used in this case works with rotary kinematics and has a #17.08 file for cervical preparation, and #20.04, #25.04 and #30.04 files for formatting the root canal system.

The pulp chamber was irrigated with 2.5% sodium hypochlorite and a #10 C-Pilot file (VDW GmbH, Munich, Germany) of 21 mm was introduced up to two thirds of the apparent length of the element. 17.08 and the working length (WL) was set at 1 millimeter below the measurement obtained with a Finepex® electronic apex locator (Schuster Equipamentos Odontológicos, Santa Maria, RS, Brazil). The #10 C-Pilot file was introduced up to the WL of each channel with the help of the oscillatory motor (NSK, Tokyo, Japan) and the files #20.04, #25.04 and #30.04 were introduced in the channel with light pecking movements until they reached the WL The entire instrumentation process was performed with copious irrigation with 2.5% sodium hypochlorite and at each rotary file change, the patency length (PL) was recapitulated with a #10 file.

At the end of the CMP the solutions of sodium hypochlorite and 17% ethylenediamine tetraacetic acid (EDTA) (Lenza Farm, Belo Horizonte, MG, Brazil) were activated by mechanical agitation in 3 cycles of 20 seconds each, with the aid of from EasyClean® (Easy e Bassi Equipamentos Odontológicos, Belo Horizonte, MG, Brazil) 3 mm short of the PL Between each change of irrigating solution, 5 ml of saline solution (Lenza Farm, Belo Horizonte, MG, Brazil) was dispensed inside the canals, in addition to a final irrigation with the same product.

The root canal system was dried with DiadentCell Pack absorbent paper tips (Diamond Dental Industrial Co. Ltd, South Korea) and the filling performed with Feapex® paste (Fórmula e Ação, São Paulo, SP, Brazil) introduced into the canals with the aid of a #30 lentulo spiral (Dentsply Sirona Endodontics, Ballaigues, Switzerland) (Figure 4).

Figure 3 - Periapical radiograph after obturation of the root canal system. The correct filling of the root canal system is observed, without material leakage into the periapical tissues.

Source: Authors (2022).

Root canal shielding was performed with Riva Self Cure light-cured glass ionomer cement (SDI, Bayswater, Victoria, Australia). An occlusal test with carbon (Angelus, Londrina, PR, Brazil) was performed, followed by the necessary adjustments, and the final radiograph was performed. Patient and guardian received appropriate guidelines for postoperative care and the need to perform clinical and radiographic follow-up.

4. Discussion

Oligodontia can be associated with a syndrome, mainly ectodermal dysplasia, Down syndrome and chondroectodermal dysplasia (Mitsui et al., 2014; Koskinen et al., 2019) or non-syndromic, mostly as a genetic inheritance of mutations in the PAX9, EDA and MSX1 genes, however the current grant emphasizes that both versions represent different severities of the genetic alterations (Fauzi et al., 2017).

In the present case, we did not find no associated syndrome or history of systemic disease, infection, trauma, or radiation exposure that could cause the dental changes. Based on the report of the history of multiple agenesis in the paternal family, clinical and radiographic findings, it is assumed that the genetic factor determined the patient's phenotype pattern, a hypothesis that corroborates the literature.

Tooth agenesis can result in malocclusion, atrophy of the alveolar bone and a more retracted position of the mandible and, among the therapeutic options, we can mention orthodontic treatment, prosthetic rehabilitation or implant-supported crowns (De Santis et al., 2019; Jurek et al., 2021). In view of the aforementioned options, the choice of maintaining the deciduous element is defended by Consolaro et al. (2021), because in the absence of the permanent element, the process of rhizolysis is slow and happens partially, making the element stable after a few months, allowing the maintenance of space and alveolar bone.

Despite advances in preventive dentistry, the global prevalence of caries disease in primary teeth is still high (Kazeminia et al., 2020) and microbiological aggression can lead to pulp tissue necrosis, resulting in contamination of the root canal system and signs and symptoms arising from infection (Chauhan et al., 2019; Priyadarshini et al., 2020). Therefore, the therapy proposed in the present work is in accordance with the current literature, as the endodontic treatment of deciduous teeth is a conservative alternative to early extractions of necrotic deciduous teeth.

Endodontic treatment in deciduous teeth presents some challenges, including patient compliance with the procedure time, operator wear and internal anatomy (Chauhan et al., 2019; Priyadarshini et al., 2020). In the present work, the chemical-mechanical preparation was carried out with the aid of automated Ni-Ti instrumentation, a factor that reduced clinical time, favored the canal negotiation process and influenced the quality of the filling (Barasuol et al., 2021; Boonchoo et al., 2019; Chauhan et al., 2019; Priyadarshini et al., 2020).

The success of endodontic treatment is closely related to the efficiency of disinfection of the root canal system and only mechanical preparation is insufficient to achieve it (Burns et al., 2022). Areas untouched by instrumentation can harbor viable bacteria and necrotic tissue, in addition to the formation of the smear layer, a barrier between the filling material and the dentin, protecting microorganisms in the dentinal tubules, so the irrigation protocol is essential (Pozos-Guillen et al., 2016). Several irrigating agents are used in deciduous teeth, however sodium hypochlorite and EDTA are considered the gold standard for removing the organic and inorganic portion, respectively. The protocol adopted in the present work is in accordance with the importance of irrigation (Burns et al., 2022; Pozos-Guillen et al., 2016)

In primary teeth, the ideal filling material should be antibacterial, resorbable and does not cause damage to the periapical region or to the permanent tooth germ. The choice of filling cement formed by calcium hydroxide and iodine paste is supported by the literature, with good characteristics and success rates of around 84 to 100% (Najjar et al., 2019).

5. Conclusion

Patients with oligodontia present chewing difficulties, aesthetic, psychological, respiratory and phonation problems. Pediatric dentistry and endodontics play a fundamental role in this context by providing diagnosis, patient care and treatment, promoting integration with a multiprofessional team, essential for an improvement in the quality of life of these individuals. The management of primary teeth with missing permanent teeth is limited, therefore, long-term longitudinal studies are needed to assess the consequences of missing permanent teeth in young patients.

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