EXTERNAL CERVICAL RESORPTION TYPE II: A CASE REPORT

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ABSTRACT

External cervical resorption (ECR) is the loss of dental structure in the region immediately below the point of epithelial adhesion to the tooth. ECR occurs when there is a rupture in the non-mineralized protection layers, allowing the contact of clastic cells, which adhere to the dentin. Such cells, when being stimulated by some external factor, perpetuate the process. ECR is an invasive and aggressive root resorption, and its treatment is most times challenging. This report describes a clinical management of ECR performed at the same appointment of endodontic treatment and final access restoration.

KEYWORDS: Bone Resorption, Endodontics, X-Ray Computerized Tomography, Root Canal

1. INTRODUCTION

Dental resorption is the loss of dental structure, such as dentin and cementum, due to clastic cell activity[1]. This process occurs physiologically to primary dentition, causing dental exfoliation. Root resorption in permanent dentition does not occur naturally and it is always related to an inflammatory factor[2,3]. This pathology starts after a pulp injury or the periodontal ligament, involving inflammatory and clastic cells, and hard tissue structures[4].

Root resorptions are generally classified in two main types, internal and external, depending on their location and relation to the root canal. Usually, external resorptions do not preserve the bounds of the canal wall, modifying its form. In counterpart, external resorptions start at the external root surface, maintaining the shape of the root canal [3]. They can be differentiated through radiography taken in orto-radial and different horizontal angles, or through computerized tomography, a method of examination that shows to be extremely superior[5,6].

A less common phenomenon is external cervical resorption (ERC), which among external resorptions, initiates immediately apically to the point of epithelial adhesion to the tooth, and possesses an invasive and aggressive nature, thus, can also be called cervical invasive resorption, supra-osseous extra-canal invasive resorption, peripheral inflammatory root resorption and subepithelial external root resorption[3,4]. ECR occurs when there is a rupture in the nonmineralized protection layers, allowing the contact of clastic cells, which adhere to the dentin. Such cells, when stimulated, perpetuate the process[1]. The union between the enamel and cementum is variable and frequently discontinuous, which can lead to the exposure of dentin areas, favoring the initiation of such process[3].

Orthodontic treatment, trauma, oral surgery, periodontal treatment and internal tooth whitening in teeth with previous endodontic treatment are predisposing factors of ECR[1, 7,8]. Clinical characteristics are variable. It is frequently a silent and asymptomatic process, discovered by a routine radiography. It is classically presented as a radiolucent image, with irregular margins at the cervical region of the tooth[9].

Clinically, with the evolution of the process, a pinkish discoloration of overlying enamel can be visualized, due to the granulation tissue from the resorption, which starts being visible through the thin layer of dentin and enamel[4]. This loss of structure can also perforate the dentin and the enamel, and present the appearance of gingival hyperplasia, if is within the gingival margin. If it is not treated, the resorption evolves, generating irreversible loss of dental structure[9]. During probing, bleeding can occur due to the granulation tissue[5].

The pulp of the tooth with ECR can present no alterations, or a case of pulpitis, or, in more sporadic cases, pulpar necrosis. The prognosis and the form of treatment varies according to the pulpar diagnosis and the position of the ECR[3]. Usually the pulp is not involved, only in more advanced cases, due to it being protected by a thin layer called pre-dentin[9].

Heithersay developed a classification with clinical and radiographic criteria for ECR, which is as follows[6-9]:

Class I - Resorption with little penetration (superficial) to the dentin at the cervical area.

Class I - More invasive resorption, which goes near the pulp-chamber, with little or insistent penetration in the root dentin.

Class III - The resorptive tissue penetrates, develops and debilitates the coronal third of the root.

Class IV - Resorption reaches more than the coronal third of the root.

Also according to this author, the rate of success of

the ECR treatment depends on the penetration of the resorptive tissue. Thus, it depends on the classification, with success occurring in around 100% of class I and II cases; 77,8% of class III cases and only 12,5% on teeth with lesions classified as class IV[6]. In this context, the present study aims to report a clinical case with diagnosis and treatment of ECR in a single appointment. Therefore, the clinical protocol proposed with the performance of the ECR treatment concomitantly to endodontic treatment is to be emphasized.

2. CASE REPORT

Male patient, 22 years old, was referred to the Endodontics postgraduate clinic at COESP faculty, in João Pessoa, Paraíba, Brazil. The patient presented a pinkish discoloration at the clinical crown of the right lateral maxillary incisor (Figure 1A), with no history of pain.

During the clinical examination, the tooth involved did not present mobility. The clinical percussion test presented negative results and the thermal sensitivity test for sensitivity to cold temperatures presented an intense and long-lasting response. The probing examination presented alterations at the vestibular region of said tooth, with 4 mm at the mesial region, 8 mm at the middle third (the region of pinkish discoloration) and 3mm at the distal region. The probing at the palatal region was within normal standards. The exploration of the enamel discolouration area with the use of a probe demonstrated the presence of a tissue with a fibrous texture, which bled during the manipulation.

In relation to the medical history, two months before the appearance of the pinkish enamel discoloration, the patient was admitted into a hospital for the treatment of viral mononucleosis. However there is no medical history of other relevant alterations. As to his dental history, the patient reported the use of orthodontic braces for a period of approximately 4 years.

The radiographic examination of the right lateral maxillary incisor presented a radiolucent image next to the amelocemental junction, with no defined bounds, with no alteration of the original form of the canal and extending in coronal form. The radiography did not present alterations in the periradicular region (Figure 1B). The dental resorption was near the pulp-chamber, as verified through the tomographic examination performed. The lesion was classified as class II, according to Heithersay classification (Figure 1C).

Through clinical, radiographic and tomographic evaluations, the diagnosis of irreversible asymptomatic pulpitis with no periradicular alteration in the tooth involved was stated. Owing to the great loss of dental structure in the cervical region and the possibility of preventive treatment, the performance of periodontal surgery and concomitant endodontic treatment with following dental restoration was planned. The patient signed a term of free and informed consent, allowing for the performance of the treatment and the scientific divulgation of his clinical case.

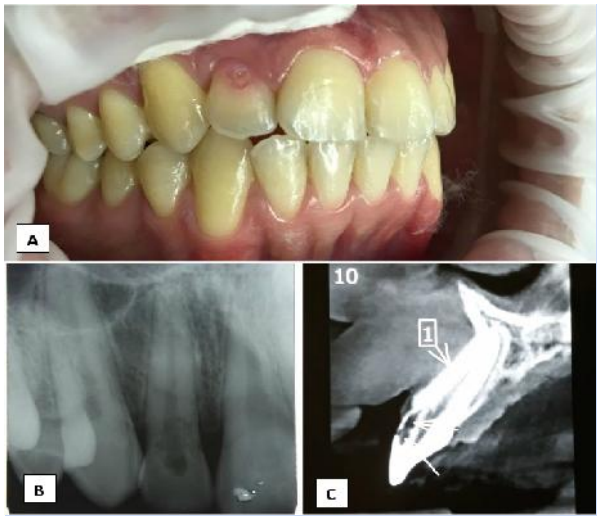

Figure 1. A - Pinkish discoloration of right lateral maxillary incisor enamel; B - Radiographic examination of the right lateral maxillary incisor presenting radiolucent images next to the amelocemental junction with no defined bounds and no alteration of the original shape of the canal; C – Tomographic image presenting lesion classified as type II according to Heithersay classification.

The patient was anesthetized with 1.8 mL of 4% Articaine 1:100.00 (Articaine®, DFL-Brasil) and a sulcular incision was made in the region included between the left maxillary incisor and right maxillary canine, with no vertical slicing. The gingival tissue was removed,for the better visualization of the operatory field (Figure 2A). The granulation tissue was removed with the help of an ultrasonic insert E3D (Helse, Santa Rosa de Viterbo, SP, Brazil) (Figure 2B and C) and a sharp curette. It presented fibrous texture and intimate contact with the pulp-chamber. During the removal of the tissue, irrigation with saline solution was used. Using the E3D insert, a refined coronary opening was performed through the vestibular face of the tooth, for the better preservation of the dental structure.

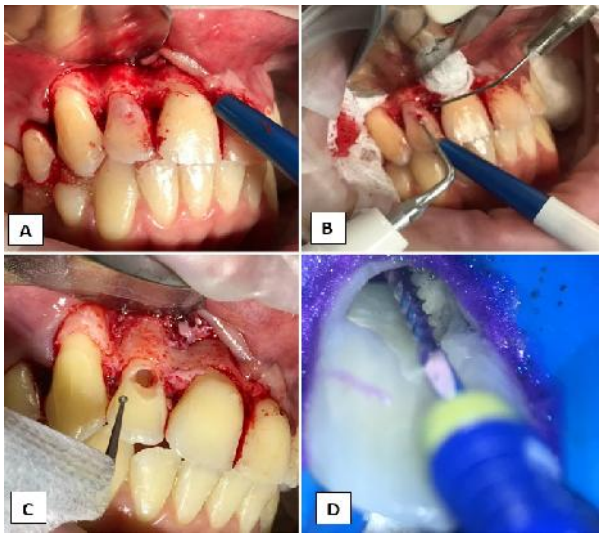

Figure 2. A- Envelope flap showing no fenestration in the region; B - Removal of the granulation tissue with the ultrasonic insert E3D; C - Coronal opening through the vestibular face with the insert E3D; D – Evaluation of the preparation with a K#60 instrument.

Posteriorly, the tooth was isolated and prepared with

a ProTaper Universal rotary F5 file (Dentsply-Mailleffer, Ballaigues, Switzerland) at 26 mm, the exact length of the tooth, obtained through electronic root canal measuring (Figure 2D). During the treatment, the tooth was irrigated with sodium hypochlorite at 2.5%, diluted in equal parts in saline solution. During the obturation, obtaining complete hemostasis of the canal was not possible. For this reason, a P.A. calcium hydroxide plug was put in place before the final obturation. The obturation was performed using the guta cone #60K (Dentsply-Mailleffer, Ballaigues, Switzerland) at 25mm, through lateral condensation technique, with the sealer AH PLUS (Dentsply-Mailleffer, Ballaigues, Switzerland) (Figure 3).

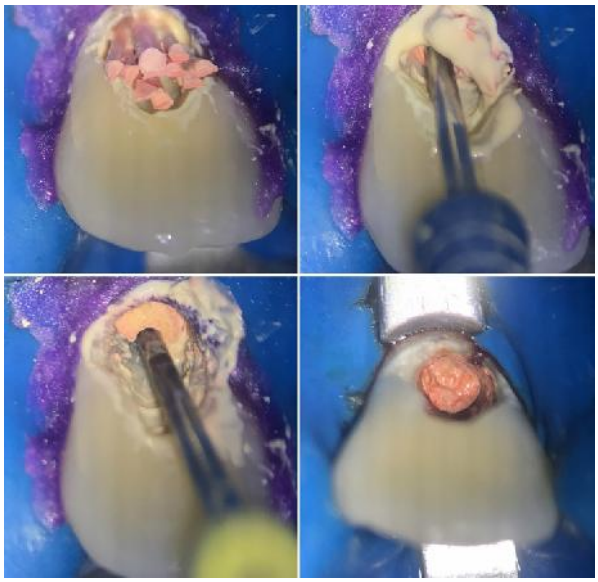

Figure 3. Obturation through the lateral condensation technique.

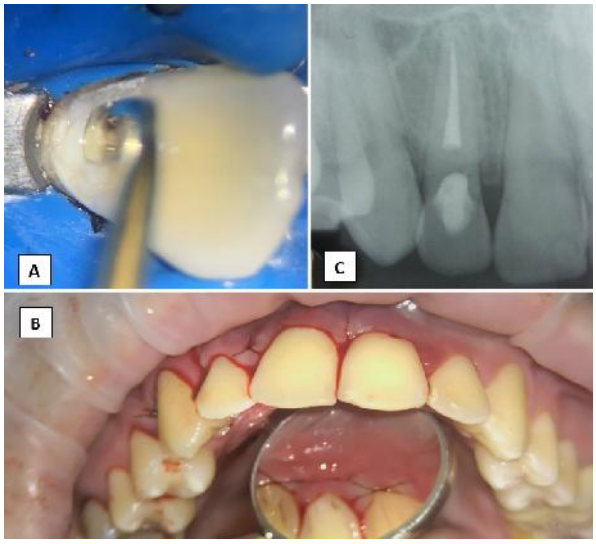

Figure 4. A - Restoration with dental composite directly under the guta-percha; B - Contention suture; C- Final periapical radiography.

Immediately after the conclusion of the endodontic treatment, a direct restoration procedure was performed. An acid attack was performed using phosphoric acid at 16%, applying the adhesive in two layers (Adper Scotchbond - 3M ESPE), inserting bulk fill resin layers (Surefil SDR Flow) directly under the guta percha and following insertion of layers of Z250 resin (3M, Sumaré-SP, Brazil) (Figure 4A). A restoration of the dental characteristics of anatomy and color was performed. Subsequently, polishing was performed on the restoration. The case was concluded with the repositioning of the gingival flap, performing a contention suture (Figure 4B) and taking a final periapical radiography (Figure 4C). Post-operatory and pain management recommendations were made in writing. In seven days, the patient returned and the sutures were removed. There was minimal pain and localized swelling, which was resolved during the review period.

3. DISCUSSION

An accurate diagnosis is essential for correct clinical management. There is often difficulty in diagnosing ECR, due to it being confused with caries or internal resorption. So, incorrect treatments for this pathology may be performed. However, as a differential diagnosis, caries are soft due to enzymatic activity and the production of bacterial acids, and the ECR presents fibrous tissue. However, both internal resorption and ECR, can present the pinkish discoloration of the overlying enamel, which can confuse the clinician. These can be differentiated through a thorough periapical radiographic examination or tomographic examination[4]. In the present case, the lesion was noticed after the removal of the orthodontic braces and the differential diagnosis was made through radiographic and tomographic examinations. The increasing use of operating microscopes and CBCT imaging in endodontics eases ICR diagnosis and management[10].

Many etiological factors may be involved with the ECR in a live tooth, such as orthodontics (45.7%), trauma (28.5%), parafunctional habits (23.2%), poor oral health (22.9%), malocclusion (17.5%) and extraction of the neighboring tooth (14%) according to the study by Mavridou[8]. The same author also affirmed that several studies relate ECR with malocclusion, wind instrument musicians, periodontitis, autotransplantation, transmission of feline viruses to humans, herpes zoster and the use of bisphosphonates. In the present case, dental history revealed the use of orthodontic braces and malocclusion. Agreeing with this same study which revealed that in 59% of the cases more than one predisposing factor was found.

Computerized tomography is fundamental for the evaluation of the depth of the lesion, in relation to the canal, to perform the case planning in an objective manner, according to the classification of Heithersay[9]. In the present case, the resorptive defect appeared next to the epithelial adhesion but, presented involvement of the coronal dentin, extending minimally to the cervical third of the root. This way, the case was classified as a Heithersay class II, for which the rate of success of the treatment is around 100%[6].

Endodontic therapy is often necessary when there is

a pulpal involvement or even due to a change in the periradicular tissues[3]. In the present case, endodontic treatment was necessary because the resorption process perforated the pulp-chamber, causing an alteration in the pulpar response to the sensitivity test to cold and due to the level of the loss of dental structure.

Throughout time, several forms of treatment for ECR were proposed, from surgical to non-surgical approaches. Non-surgical approaches promote the mechanical or chemical removal of the granulation tissue during the treatment of the root canal. The surgical approach includes procedures such as coronal enlargement or raising gingival flaps to access the granulation tissue. After the removal of this tissue, the cavity is cleansed and restored with a biocompatible material[1,6]. The MTA is extensively used in cases of ECR, when there is contact with the bone, due to presenting adequate biocompatibility and interaction with this tissue[1]. However, in this case, the resorption bounds had no contact with the bone, only with the gingival groove. So, direct composite resin restoration, with a polished surface was done to avoid periodontal injury. Also, in the present case, a better exposure of the granulation tissue was performed through an envelope flap method. Cleaning the resorbed site was done with ultrasonic tip and the root canal was then treated during the same appointment. There was the possibility of ending the present case with a direct restoration and repositioning of the gingival flap.

4. CONCLUSION

The clinician must be prepared to perform the correct diagnosis of ECR, being able to differentiate an internal resorption or caries. when an early diagnosis and correct treatment is established, it prevents more damaging and injuries. Further studies should be carried out on ECR, due to the numerous forms of treatment possible, to elucidate the most effective techniques according to the classification of the lesion and its contact with the periradicular tissue.

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