Interdisciplinary dental approach to a pregnant patient undergoing orthodontic treatment – case report

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Abstract

Endodontic treatments during pregnancy can be safely performed taking certain precautions. The aim of this clinical case, which we present in our article, was to treat an irreversible pulpitis in a second-trimester pregnancy patient who was undergoing an orthodontic treatment prior to pregnancy. The endodontic treatment was performed without removing the facial arch and brackets, in a single session, using multiple waves condensation method. The endodontic technique of vertical hot condensation used has the advantage that it can fill the entire root system three-dimensionally. After one week, the coronal restoration was made with resin composites. Teeth that are included in an orthodontic treatment can be adequately endodontically treated and coronally restored during pregnancy.

Keywords: *pregnancy, interdisciplinary approach, endodontic treatment, dental restoration, orthodontic treatment*

Rezumat

Tratamentele endodontice în timpul sarcinii pot fi efectuate în siguranță luând anumite măsuri de precauție. Scopul acestui caz clinic, pe care îl prezentăm în articol, a fost tratarea unei pulpite ireversibile la o pacientă gravidă, aflată în al doilea trimestru de sarcină și care urma un tratament ortodontic instituit înainte de perioada de graviditate. Tratamentul endodontic a fost realizat fără îndepărtarea arcului facial și a bracketurilor, într-o singură ședință, utilizând metoda de compactare în val continuu. Tehnica endodontică de condensare verticală la cald utilizată are avantajul că poate sigila tridimensional întregul sistem radicular. După o săptămână, a fost realizată restaurarea coronară cu rășini compozite. Dinții care sunt incluși în cadrul unui tratament ortodontic pot fi tratați endodontic și restaurați coronar adecvat în cursul sarcinii.

Cuvinte-cheie: *sarcină, abordare interdisciplinară, tratament endodontic, restaurare odontală, tratament ortodontic*

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Introduction

Dental treatment in pregnant women requires some particularities that limit and condition the therapeutic maneuvers[(1)]. Endodontic pathologies in these cases could be represented by pulpal inflammation (pulpitis), caused by the progression of dental caries, as well as periapical lesions. Ideally, the endodontic treatment should be performed in one session or in as few work dental sessions as possible[(2)]. The orthodontic treatment is not a contraindication during pregnancy, and it can be performed successfully during this period by taking certain precautions and in collaboration with the gynecologist[(3)].

Root canal obturation should prevent reinfection of cleaned and disinfected root canal, as well as seal any remaining bacteria inside the canal, in an environment where they cannot multiply. Among current techniques, warm vertical condensation techniques stand out, with the advantage that the entire root system, including its lateral and accessory canals, can be completely obturated[(4)].

Compared to other root canal filling techniques, warm vertical condensation fills the canal with a stable, biologically tolerated material such as gutta-percha. When heated, this compound allows for the accurate replication of the internal configuration of the endodontic system[(5)].

Case report

A 24-year-old female patient presented to the dental office with spontaneous pain in tooth 45. She was pregnant in the second trimester of pregnancy (20 weeks

from conception). The tooth had pain upon biting and percussion. There was neither fistula, nor swelling. An objective exam revealed a vital tooth, with a loss of dental structure on the buccal and occlusal faces of the tooth. The patient had fixed orthodontic braces with brackets on all teeth on the vestibular surface, which was applied before pregnancy (Figure 1). The diagnosis of irreversible pulpitis was made.

After anesthesia and isolation with a rubber dam, the coronal walls were reconstructed using Luxacore Z Dual (DMG). Rotary treatment with the Protaper Next (Dentsply Sirona) system was performed until X3 (30.06) instrument. Copious irrigation (2 ml) with 5.25% sodium hypochlorite was done after each instrument was used. The hypochlorite was agitated using the Endoactivator instrument (Dentsply Sirona), with three rounds of 20 seconds each. The final irrigation consisted of a 5-ml syringe of 5.25% sodium hypochlorite, followed by 17% EDTA for 1 minute, and then final rinse with saline solution. The canal was dried with paper points.

The canal was obturated using the multiple wave technique and AH Plus sealer (Dentsply Sirona).

Endodontic treatment using multiple waves technique

This obturation method is always performed in two sequences: down-pack, followed by back-pack phase, using different endodontic filling systems. For the down-pack step, the endodontic protocol was:

- The master gutta-percha X3 cone is cut at the root canal orifice using a Fi-P obturation system (Woodpecker), then cold compacted with a large plugger (P. Machtou no. 4).
- The tip of Fi-P is inserted into the gutta-percha cone for a distance of 3-4 mm; upon removal of the instrument from the canal, a small amount of gutta-percha will adhere to it and will be removed from the canal, allowing for the placement of the next smaller plugger (P. Machtou no. 3) in the canal and compacting the gutta-percha over a 4-5 mm section.
- These cycles of heating and vertical compaction are usually repeated three or four times, until the smallest plugger (P. Machtou no. 1) reaches the apical third and compresses the last 4-5 mm apically.

The second phase, back-pack obturation, was done following the next protocol:

- The smallest available needle of Fi-G obturation system (Woodpecker) was selected for the injection of thermoplasticized gutta-percha and inserted into the canal until it contacts the apical stop.
- Fi-G is held in place for 5 seconds to heat up the canal walls and apical gutta-percha, and a short of 3-4 mm segment of warm gutta-percha is dispensed into the root canal. The Fi-G piece should be back-out of the canal when injecting thermosoftened gutta-percha into the canal.

The tooth was temporary coronal sealed with Ketac Molar Easymix Art (3M ESPE). The postoperative X-ray was performed (Figure 2).

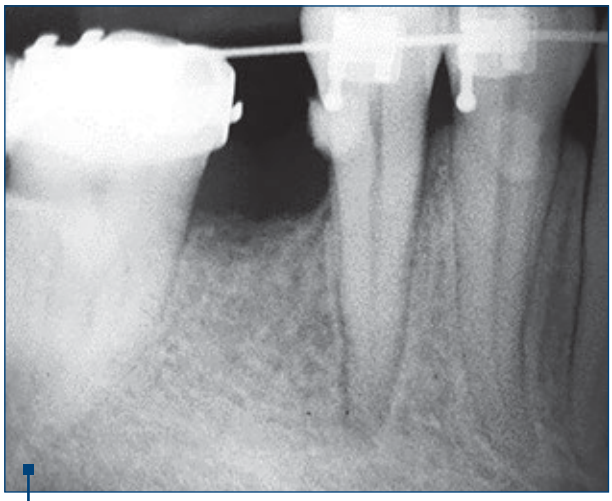

Figure 1. *Tooth 45 – preoperative radiograph*

All the endodontic treatments took place in a single visit. After one week, the pain disappeared, and the final coronal restoration with resin composites Estelite Posterior® (Tokuyama Dental Corp.) was applied.

Discussion

In this case, the patient received a single-visit endodontic treatment, without affecting the orthodontic treatment or removing the buccal arch and brackets.

Being a pregnant woman, the endodontic treatment was performed in one session, for a minimally invasive and conservative intervention from all points of view – it reduces the episodes of pain and anxiety that may occur at each treatment session, the risk of iatrogenic accidents and, the most important, it reduces the fatigue of the pregnant patient[6].

In the second trimester of pregnancy, X-rays and local anesthesia can be performed, because the risk of malformations of the neutral tube and the central nervous system of the fetus is low. However, the threshold of 50 mGy should not be exceeded[6]. An anesthesia with bupivacaine was administered with consent given by

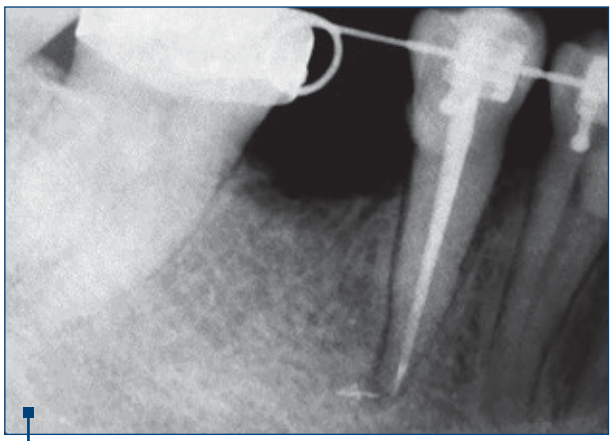

Figure 2. *Tooth 45 – postoperative radiograph, with root canal filling*

the gynecologist. The safest time to administer local anesthetics with adrenaline is the second trimester of pregnancy, when the risks are minimal[7].

The current treatment used all of the new techniques and working tools, such as: rubber dam for tooth isolation, endodontic microscope (Smart Optic, Seliga, Poland), apex locator (NSK, Japan), rotary preparation of the root canal, endodontic irrigation with 5.25% sodium hypochlorite, as well as root canal filling with three-dimensional technique. All of these improved the success rate of endodontic treatment and decreased treatment time.

Although the multiple waves technique led to extrusion of the sealing material, generally this treatment option ensures proper root canal obturation. Root canals obturated with the multiple waves technique show minimal extrusion, usually only with the sealing cement, as observed by other authors[8,9].

Sometimes gaps can occur. The thinnest needle of the Fi-G (with a diameter of 0.25 mm) may not reach the apical third of narrow canals. In other cases, the injection needle is withdrawn too quickly, without waiting for the counterpressure exerted by the injected gutta-percha mass, resulting in gaps in the canal obturation[10]. Condensing in multiple waves leads to the most accurate root canal fillings, also due to the use of a master cone with an apical diameter corresponding to the last Protaper Next rotary files used.

The importance of cleaning the non-instrumented portions of canal walls is mainly accomplished through endodontic irrigations with hypochlorite. Their effectiveness is greatly increased by raising the temperature, concentration, and volume of the sodium hypochlorite[11].

In warm condensation techniques, sealers with thin film thickness are recommended. Before the backfilling procedure, a new introduction of sealer cement into the mid and coronal portions of the canal is necessary, as the sealer may have been removed during the down-pack maneuver[12].

However, the success of root canal obturation techniques depends on the clinician's knowledge of the technique to be performed, their practical skills, and the accuracy of following the manufacturer's instructions. Failures in root canal obturations may be due to problems with the sealer, as well as the obturation techniques themselves. Other factors, such as the presence of a smear layer or air bubbles, the presence of accessory canals, fins or oval-shaped canals that are difficult to properly prepare and obturate, may also be responsible for these failures.

The restoration of endodontically treated teeth is often a challenge, due to the important volume of hard tissues loss and the modified mechanical characteristics of tooth structures of a non-vital tooth. Different direct restoration methods can be used in order to provide a better coronal restoration longevity (sandwich technique using resin composites and glass ionomer cement or layering resin composites technique). In the present case, the dental material we used was a light curing latest-generation resin composites especially designed for optimal restorations in the posterior area. It has improved mechanical properties and strength bond, with a shortened curing time of 10 seconds, which was beneficial in this situation, having a pregnant woman as patient.

Conclusions

Dental treatments in pregnant women can be performed in one session whenever possible, using new endodontic techniques that improve the success rate of endodontic treatment. Teeth that have received orthodontic treatment may be adequately treated endodontically, followed by odontal restoration, as endodontic treatment is not a contraindication for orthodontic treatment. ■

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