

The endodontic treatment in pregnancy

Irina-Maria Gheorghiu¹,
Sînziana Scărlătescu²,
Loredana Mitran³,
George Nicola⁴,
Paula Perlea⁵,
Alexandru A. Iliescu⁶,
Mihai Mitran⁷

1. Department of Restorative Odontology, Faculty of Dental Medicine, "Carol Davila" University of Medicine and Pharmacy, Bucharest, Romania

2. Department of Endodontics, Faculty of Dental Medicine, "Carol Davila" University of Medicine and Pharmacy, Bucharest, Romania

3. Department of Otorhinolaryngology, "Elias" University Emergency Hospital, Bucharest, Romania

4. Department of Medical Legal Elements and Malpractice, Faculty of Medicine, "Carol Davila" University of Medicine and Pharmacy, Bucharest, Romania

5. Department of Endodontics, Faculty of Dental Medicine, "Carol Davila" University of Medicine and Pharmacy, Bucharest, Romania

6. Department of Oral Rehabilitation, Faculty of Dental Medicine, University of Medicine and Pharmacy of Craiova, Romania

7. Department of Obstetrics and Gynecology, "Carol Davila" University of Medicine and Pharmacy, Bucharest, Romania

Corresponding author:
Sînziana Scărlătescu
E-mail: sanzianas@gmail.com

Abstract

Dental treatments during pregnancy represent a situation that dentists frequently face. The pregnant patient presents to the dental office both for dental restoration procedures and for endodontic treatment. Endodontic treatment is necessary in case of pulpal and periapical pathology (pulpitis, periodontitis) and has a number of characteristics that must be known and taken into account. The main precautions are related to: the need for radiological examination, the use of local anesthetics, dental isolation using the rubber dam system, the use of antibiotics. This article presents the modalities of endodontic treatment in pregnancy, by determining with electronic devices of the endodontic working length, as well as updates on the radiation dose or the possibility of using different drugs in pregnant women.

Keywords: pregnancy, endodontic treatment

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Rezumat

Tratamentele stomatologice pe parcursul sarcinii reprezintă o situație cu care medicii dentiști se confruntă în mod frecvent. Pacienta însărcinată se prezintă la cabinetul stomatologic atât pentru manopere de restaurare odontală, cât și pentru tratament endodontic. Acesta este necesar în cazul afecțiunilor pulpare și periapicale (pulpită, parodontită apicală) și prezintă o serie de particularități care trebuie cunoscute și luate în considerare. Principalele precauții sunt legate de: necesitatea examenului radiologic, utilizarea anestezicelor locale, izolarea dentară cu ajutorul sistemului diga, folosirea antibioticelor. Acest articol prezintă modalitățile de tratament endodontic în sarcină, prin determinarea cu mijloace electronice a lungimii de lucru endodontice, precum și actualizări privind doza de radiații sau privind posibilitatea de utilizare a diferitelor substanțe medicamentoase la femeia gravidă.

Cuvinte-cheie: sarcină, tratament endodontic

Endodontic treatment in pregnancy

Dental treatments in pregnant women are commonly performed today, following the same treatment principles that govern the entire dental medicine. However, the physiological peculiarities of the pregnant woman impose, limit and condition these therapeutic maneuvers⁽¹⁾.

The pregnant woman benefits both of odontal treatments, which aim is the restoration of hard dental tissues loss, but also of endodontic treatments. Most often, the latter are a consequence of a dental emergency, whether we are talking about a dental pain, flare-up or coronal fracture that opened the pulp chamber. Dental pathologies that require endodontic treatment are partial or total pulpal inflammation (pulpitis), caused by the progression of dental caries or dentoalveolar trauma, as well as periapical lesions, when they flare up during pregnancy⁽²⁾.

For all dental treatments in pregnant women, the following known objectives are met:

- minimum treatment sessions both in duration and number, thus a minimally invasive and conservative intervention from all points of view;
- operator stress as low as possible for the patient through a gentle and understanding attitude of the dentist; adjusting the dental chair to a comfortable position, especially in the third trimester of pregnancy; treatment sessions with frequent breaks;

- dental work must be performed at the same time very correctly, so as to avoid the return of the pregnant patient with a more complicated or advanced form of dental pulpal pathology (for example, the application of a simple endodontic analgesic dressing does not solve an acute partial pulpitis, whose progression to fulminant exacerbation as total pulpal inflammation is certain)⁽³⁾.

General principles of endodontic treatment

Ideally, the endodontic treatment should be performed in one session, if not, in as few work dental sessions as possible⁽⁴⁾. In order to fulfill this objective, the principles of endodontic treatment in pregnancy are:

- The current use of new techniques and working tools such as rubber dam for teeth isolation, magnifying glasses or endodontic microscopes, apex locator, mechanical preparation of root canals, endodontic lavages with antiseptics and ultrasonically activated chelators, as well as root canal filling with three-dimensional techniques improve the success rate of endodontic treatment and decrease treatment time⁽⁵⁾.
- Endocanalicular therapy can be performed in one session if time allows the complete cleaning and disinfection, and the canals can be completely dried.
- Although a longer treatment session may cause discomfort to the pregnant patient, the inability to remove

bleeding or inflammatory exudate from the canal may prevent root canal filling in the same session as the preparation.

- Calcium hydroxide is the choice endodontic antiseptic between treatment sessions.

The advantages of one session endodontic treatment are:

- there is no risk of microbial infiltration through temporary coronary restoration between sessions;
- fewer treatment sessions bring benefits for both doctor and patient;
- it reduces episodes of pain and anxiety that may occur at each treatment session;
- it reduces the risk of iatrogenic accidents (perforations, stripping).

The most important disadvantages would be: the fatigue of the practitioner during a long work session, as well as the fatigue of the patient, having to stand still for a long time⁽⁶⁾.

Specific aspects of endodontic treatment in pregnancy

The specific aspects of the endodontic treatment in pregnancy are related to the pulpal/periapical condition that is being treated, but all the endodontic maneuvers have common aspects. These are:

1. The need to perform an endodontic treatment along the entire length of the root canal, this means the need to know precisely its length. Currently, it is the retroalveolar dental radiography that establishes this aspect (except for the panoramic radiography, which does not offer fine details regarding the morphology, topography and possible periapical pathologies). In recent years, both for the diagnostic phase and for the treatment phase, conical beam tomography (CBCT) has been used. The current problem is the dose of radiation used, although recent studies have shown that modern digital radiology technology uses acceptable doses without major risks.

Some dentists avoid performing X-rays in the first trimester of pregnancy, taking into account the teratogenic risk that X-rays may have. Rather, they indicate only the treatment of endodontic flare-ups, like analgesic pulp treatment, endodontic drainage and the postponement of definitive treatment until the second trimester of pregnancy. The main reason for this approach is that, without an initial radiograph of the affected tooth, performing the final endodontic treatment has some risks in terms of correct determination of the working length of the root and the canal inside it.

Recent research has shown that exposure below 50 mGy, used by standard radiology procedures, does not pose a risk to the fetus⁽⁷⁾. The dose of radiation that the fetus receives depends on the organ examined, in particular the distance between the mother's examined organ and her uterus. The greater the distance between the examined organ and the uterine cavity, the less radiation the fetus will be exposed to, as it will dissipate in the mother's body. Thus, an X-ray in the cervical area of the head and neck produces an exposure below 0.001 mGy, while a cranial CT leads to an exposure of 0.1-1 mGy. In this case, the effects of radiation on the foetus are considered to

be negligible and the risk of prenatal death or malformation does not exceed the risk encountered in the general population⁽⁸⁾.

The most vulnerable period for the foetus is between 8 and 15 weeks from conception, because then the differentiation of the neural tube and the central nervous system takes place, and the exposure to radiation over 100 mGy leads to mental retardation. Between weeks 16 and 25, the risk of malformations of the nervous system is low, as well as in the embryonic stage (weeks 2-8 after conception). Therefore, from the point of view of radiological examinations, the threshold of 50 mGy should not be exceeded, meaning three abdominal CT examinations or 20 radiographic examinations.

The assessment of the result of an endodontic treatment at the time of its completion is radiologically highlighted, thus the problem of the radiation dose to which the future mother is exposed appears again. Therefore, one can choose to delay the completion of endodontic treatments until they are no longer conditioned by pregnancy. We can achieve this by inserting calcium hydroxide in the root canals, unanimously accepted at present in endodontics, whose effect lasts for several months (it can be changed every 30 days).

In order to determine the root canal length on which endodontic treatment should be performed, other scientifically documented methods can be successfully used, on which the dentist can rely, namely: the electronic method using the apex finder, also the clinical method based on tactile sense and the use of statistical mean lengths of teeth.

The apex-finder is a device that can measure the length of the root canal to the apical foramen, not to the radiological apex, and state-of-the-art devices even claim to be able to detect apical constriction. The apical constriction is the ideal place to which the root canal will be instrumented, in order to close it. It is located at a distance of 0.5-1 mm from the apical foramen. In some cases, the apical foramen does not coincide with the anatomical apex, and can be located laterally. Apex new locators accurately measure the electrical resistance between deep periodontal and mucosal tissues, a resistance that is constant in each individual and is not influenced by age or the type or shape of teeth and is around 6.5 kΩ.

The following conditions are required for the determination:

- the root canal should be almost dry (the presence of NaOCl sodium hypochlorite endodontic irrigation solution negatively influences the determination);
- the endodontic file has a suitable diameter (no files smaller than 15 ISO will be used);
- the file should not come into contact with a metal material for coronary restoration.

The method to determine the length of the root canal using the apex-finder device is:

- the endodontic access cavity must be completely isolated from micro-/macroleakage;
- the operating field must be dry (rubber dam teeth isolation is essential to be used);

- the lip clip of the instrument will be positioned in the facial area;
- the hook of the device will be positioned on the instrument/file with which advances into the root canal until the signal indicates the apex;
- 0.5 mm up to 1 mm are deducted from this size and this is the final working length determined electronically.

This way of determining the endodontic length, which is currently used in dental practice, has a high accuracy (up to 97%) and can be the method of choice for measuring the root canal in pregnancy⁽⁹⁾.

2. Most endodontic treatments are needed due to the acute dental pain caused by inflammation of the dental pulp. That's why the first objective is to perform **dental anesthesia**, so that the necessary therapeutic maneuvers can be conducted. Pregnancy limit and condition their use, and any allergic reactions that may occur must also be considered.

If endodontic treatments like vital pulp extirpation are required, the amount of anesthesia administered should be kept to a minimum, but large enough to exclude pain. There are conflicting studies on the side effects of anesthetics, even for low-toxic anesthetics (xylin, bupivacaine or mepivacaine), and some experts recommend to avoid their use in the first trimester of pregnancy, where organogenesis occurs⁽¹⁰⁾. The opinion on the use of a certain type of anesthetic in pregnant women, as well as the dose that can be administered, is recommended to be given by the gynecologist. An anesthetic used regularly in dental medicine – namely, lidocaine – is highly recommended when treating pregnant women. It belongs to the so-called category B of biological substances and is considered to have no adverse effects on the mother and fetus. The American Dental Association (ADA) recommends local anesthetics with epinephrine (adrenaline), in association with bupivacaine, lidocaine and mepivacaine. The safest time to administer local dental anesthesia is the second trimester of pregnancy, when the risks are minimal⁽¹¹⁾.

3. The endodontic treatments are performed using **rubber dam isolation**, which involves the application of clamps at the cervical dental level. The role of rubber dam isolation method is to prevent the endodontic irrigation solutions like sodium hypochlorite (NaOCl) to

get into contact with oral cavity. In the presence of pregnancy gingivitis, which is accentuated as the pregnancy progresses, the placement of dam clamps can cause a (sometimes abundant) gingival bleeding, along with the painful sensitivity created, which the pregnant woman feels more strongly during this period of her life. Also, hemostasis in case of bleeding in pregnancy gingivitis is difficult to achieve⁽¹²⁾. Even the use of the dam system, which involves isolating the oral cavity through a rubber sheet, can be perceived by the pregnant woman as a great discomfort, knowing that the psychoemotional status of the woman is a special one.

4. During endodontic treatments, we are often confronted with flare-ups of the preexistent conditions, especially if we treat a tooth with periapical lesions. These flare-ups requires oral medication of **antibiotics**. Pregnancy has implications and induces limits and precautions from this point of view, as well. In some flare-ups of the apical periodontium, with the development of serous or purulent exudate, they are indispensable to prevent the spread of infection, but will not be administered without the consent of a gynecologist. Ampicillin is usually the most indicated antibiotic; penicillin can also be administered, as well as cephalosporins, clindamycin and erythromycin. On the other hand, it should be emphasized that antibiotics such as streptomycin, kanamycin, gentamicin and tetracycline are totally contraindicated during pregnancy, as a result of potential teratogenic effects^(13,14).

In order to avoid the use of antibiotics during pregnancy, it is indicated to delay the need for endodontic treatment of any chronic apical pathology (unless we are confronted with an acute situation) and also to delay the final endodontic root canal filling until the local and general condition of the female patient allow a rigorous endodontic treatment. The temporary calcium hydroxide root canal filling may be used during the pregnancy period, as previously presented. ■

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