

ENDODONTIC TREATMENT FAILURES

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Abstract: *The causes of endodontic treatment failures depend on technical, biological or iatrogenic factors, which contribute to the accomplishment of the treatment. Knowing and understanding the relation between these factors may help in increasing the chances of preventing the possible endodontic treatment failures.*

Keywords: *endodontic treatments failures*

Rezumat: *Cauzele unor eșecuri în endodonție depind de factori tehnici, biologici sau iatrogeni care contribuie la realizarea tratamentelor endodontice. Cunoașterea și înțelegerea cauzalității dintre acești factori contribuie la sporirea șanselor de prevenire a unor posibile eșecuri ale tratamentelor endodontice*

Cuvinte cheie: *tratamente endodontice, eșecuri posibile*

The chances of curing the pulp affections require endodontic treatment, which involves the removal of the pulp and root canal obturation. This might also be the source of possible failures.

A. Failures due to technical reasons.

In most cases, these are related to root canal anatomy and may be due to the following causes:

- Root variation in terms of shape and length are due to the non topical dental morphology, or due to certain root resorptions, short roots with large canals. Root variations inconveniences may be overcome by retroalveolar X-rays with needles in canals or by the electronic measurement of the root length (locator apex).
- Additional root, most of the times revealed only by oblique radiography. Double canals, apically bifurcated canals or even pulp diverticulum may be detected on this occasion, as well.(1)
- Cavity access with insufficient opening. The cavity access should allow the surgeon to remove the affected tissue, as well as to handle the instruments in the best conditions. When carrying out the access, we should consider the location of canal holes, which most of the times are masked by hyper calcifications and secondary dentine root filling. In order to emphasize the opening of the root canal, we are sometimes forced to use the colouring agents (they are more strongly retained by the soft tissues) or sodium hypochlorite/hydrogen peroxide (which

produce bubbles when they are in contact with organic pulp substances).

Root canal irrigation plays a key role in the success of the endodontic treatment. This is obtained through irrigation and mechanical removal of the root canal contents and of the smear layer. In addition, there is a chemical dissolving of the organic tissue, which depends on the chemical composition of the irrigation substance. A good irrigation depends on the quantity of the solutions used, on the antiseptic efficiency (freshly prepared solutions are more efficient) and also on the degree of penetration of the antiseptic used. However, there is no ideal irrigation solution, so the association of certain complementary solutions is the most effective method.

The most recommended antiseptic solutions for endodontic lavages are: hydrogen peroxide (10% vol.), hypochlorite sodium (1-3% vol.), clorhexidine gluconat solutions (1-3%), MTAD Bio Pure Solutions (doxycyclin hyclat 3%, citric acid 4.25%, 0.5 detergent Tween 80) solutions containing chelating substances (EDTA, citric acid), which have the advantage of an easier penetration of the canal, removing the remaining debris.(2) Chelating substance can sometimes be at the origin of therapeutic failures by creating false routes, using wrong methods. By the use of the antiseptic substances, the efficiency of the antibacterial treatment is increased; it is suggested to use sodium hypochlorite, as the last substance used, because it has a great power of neutralizing the traces of the chelating substances and of promoting a more alkaline pH, which prevents bacterial multiplication.(3)

B. Failures due to biological reasons.

These failures are due to wrong mechanical training or to a pure filling material.

The requirements of an ideal filling material are the following:

- The antiseptic power should be longer;
- The material should not be irritating;
- To provide three-dimensional tight closing;
- To be stable overtime;
- Easy to handle and remove.

Biological healing (cement closure of the apex) can be prevented by a mechanical processing with a diameter of more than 0.25 mm of the apical area. A shorter preparation over 0.5-1 mm of the radiological apex can be a source of endodontic failure, because it may

CLINICAL ASPECTS

leave in apical area, microorganisms, enzymes or toxins, which lead in time to inflammatory lesions. Exceeding the length of the root canal is another source of treatment failure, because it prevents the canal drying, removing the possibilities of biological healing. Moreover, it is a source of irritation for the neighbouring tissues (apical periodontium, sinuses and dental nerves).

In case of injuries, which lead to the disappearance of the apical constrictions, a limit in the canal preparation is required, according to the clinical and radiological evaluation with the needle in the canal. In practical terms, this is done manually or with rotary tools and has as results, the creation of a blocking cone.(4,5)

The classical electronic method for measuring the length of the root canal, based on the tactile sense of the apical constriction, is considered today an empirical and non efficient method. Radiography with needles in canal is considered more accurate, but it still has certain shortcomings related to the phenomenon of parallax and to the repeated exposures to radiation, regarding the patients.

The current electronic method for measuring the length of the root canal (based on the electrical potential difference between the crown and dental apex) is the most precise and has the most reduced side effects. This method requires certain conditions for the accuracy of results, such as: filling removal or metallic micro prosthesis from the examined tooth, choosing the right diameter channel instruments. This is not indicated to peace-makers bearers. There are clinical situations, such as the presence of suppurate apical exudates, calcium hydroxide on the root walls, or an impenetrable apical foramen, which may bring about wrong results of the canal length.

C. Healing failures of certain periapical injuries in spite of an endodontic correct treatment.

Desiderata of a right endodontic treatment consist in the prevention of bacterial colonization, the use of a biocompatible material, tight and stable filling overtime. Depending on the clinical situation, it is suggested that the endodontic treatment follow these steps:

- In absence of apical periodontitis – canal obturation should be done in one time phase;
- In presence of apical parodontitis – canal obturation should be done in two times (first time – temporary filling with calcium hydroxide and second time - the final canal filling)

Despite a proper endodontic treatment, the occurrence and/or the persistence of periapical lesions may be due to certain diagnosis mistakes (6):

- Periapical infections in apical parodontitis case with significant osseous resorptions;
- Root fissures of fractures with hidden symptoms;
- Bacterial flora persistence in undetected canals;
- Well-built apex infections, under the form of a cyst or abscess, which require surgical treatment;
- Persistence of foreign bodies in the apical area;

- Coronary deficit tightness, which may be the starting point of certain bacterial infiltrations of the oral cavity towards the periapical space.

D. Failures due to iatrogenic reasons.

The most common causes are the fractures of the steel and nickel-titanium endodontic instruments. In these cases, retro alveolar X-rays in different incidences are indicated. Afterwards, it is suggested to intervene surgically in order to remove the broken instruments. The removal protocol is to create an access way near the fractured fragment, its lavage with sodium hypochlorite and chelating substances. Handy needles or needles attached to an ultrasound tartar removal instruments (Pro Ultra Endo-Maillefer, ET 25 - Satelec) will be used to mobilize and extract the fragment. The fractured nickel and titanium instruments are removed with more difficulty than the steel instruments.(5,6).

Other iatrogenic causes may be the false ways, or the punching of the pulp floor, as a result of the inappropriate use of the dental instruments. The approach of these perforations involves the prevention of bacterial contamination, the use of antiseptic solutions, such as sodium hypochlorite or MTAD. Afterwards, the obturation of the false canal with an adhesive material, such as the glass-ionomer cements.

CONCLUSIONS:

Knowing the possible sources of endodontic treatments failures must determine the dentist to adopt a proper treatment according to the technical equipment, so that the patient should be safe from endodontic treatment failures.

Whatever the clinical situation would be, the patient should be informed clearly about the treatment possibilities and their prognostic.

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