

ALGORITHM FOR A STEP-BY-STEP DESCRIPTION OF A TOOTH WITH PERIODONTITIS ACCORDING TO RADIOLOGICAL DIAGNOSTIC DATA

V. A. Klyomin

N. L. Khabilov

F. Mukhitdinova

S. Sharipov

Phone. +79494350500;

E-mail: ortstom_dsmu@rambler.ru

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An X-ray image is an everyday object of study in dental practice and is widely used in the diagnosis of periodontitis. This is recorded in their treatment protocols. CT is used sporadically for these purposes to this day.

It was noted that the use of a protocol for a step-by-step description of the pathology based on radiological diagnostic data provides further adequate treatment tactics.

However, a step-by-step diagnostic protocol for describing a tooth with periodontitis according to diagnostic radiology examination data is not provided. This determines the relevance of this work.

Purpose of the study. Present a working version of the proposed and tested protocol for a step-by-step description of a tooth with periodontitis based on radiological diagnostic data and give an explanation of why this is necessary.

Materials and methods. A methodology for carrying out a description of the protocol for a step-by-step description of a tooth according to radiation diagnostics for periodontitis, proposed and tested at the departments of orthopedic dentistry, as well as radiation diagnostics and radiation therapy of the Donetsk National Medical University. M. Gorky.

Results. The tested protocol for a step-by-step description of periodontitis based on radiological diagnostic data provides the following algorithm: assessment of communication between the tooth and oral cavity; identification of anomalies in the pulp cavity; establishing the number of roots; characteristics of the number of root canals as well as other manifestations of pathology in them; apical characteristics of the canal: curvature of the roots of the tooth and canals and their shape: morphological form of apical periodontitis; channel filling; detection of perforations: assessment of the success of the treatment.

Conclusions. The presented protocol for a step-by-step description of a tooth examination for periodontitis based on radiological diagnostic data is an effective method of multifactorial assessment of dental status.

Radiation methods for examining teeth are a reasonable step in providing dental care to patients. They have a special place in the practice of endodontics.

An X-ray is an everyday object of study in dental practice for periodontitis. This is recorded in their treatment protocols. [1] It is the most widely used method of additional research, CT is used sporadically to this day during the examination stages. [13].

Analysis of studies to obtain data for the purpose of assessing dental status in this pathology is carried out directly by dentists. [4]

At the same time, in practical healthcare, for some reason, according to the protocol for providing medical care, descriptions and its registration in the medical history (card) are not required. [11, 14]

Standard radiological methods for studying periodontitis have been used for a long time and have proven their usefulness in the examination, but a number of authors believe that they receive only indicative information about the pathological process (dental status). The computed tomography (CT) method allows solving the problem of intravital diagnostics and invasively assessing the destructive process in the periodontium and the structural features of the “tooth-periodontium”. [15]

To diagnose pathological changes, a clear understanding and knowledge of x-ray anatomy is necessary, and according to CBCT data, it has its own characteristics. [4]

We have not identified an algorithm for diagnostic analysis of a number of dental diseases based on the results of radiological diagnostics for these methods.

Therefore, a step-by-step diagnostic protocol for describing a tooth with periodontitis and based on X-ray and CT examination data is also not carried out, which determines the relevance of the work.

Purpose of the study. Present a working version of the proposed and tested protocol for a step-by-step description of a tooth with periodontitis based on radiological diagnostic data and give an explanation of why this is necessary.

Material and methods. The research materials are interdepartmental research on the topic: “Long-term results of endodontic treatment of chronic periodontitis, causes of adverse outcomes and ways to solve them.”

The methodology for describing the protocol was proposed and tested at the Department of Orthopedic Dentistry of Donetsk National Medical University. M. Gorky.

It should be taken into account that the literature describes multiple atypical and diverse terms that serve to describe the same morphological variants of the structure of teeth. Alternatively, the same names are used to refer to two different anatomical variations. Terms that have become popular over time due to their simplicity are often erroneous and imprecise. Such terms cannot anatomically determine the location of the canals, and have no analogues in scientific terminology. Consensus has not been established to date.

A complete list of anatomical formations, taking into account the above, which should be paid attention to when carrying out the analysis is included in the proposed protocol in accordance with the available information protocols for the provision of dental care in the treatment of periodontal diseases [9] and ICD - 10 (ICD-C). [3]

1. Assessment of communication between the tooth and mouth

1.1 Availability of message (no, available)

1.2 Localization of the message (distal, medial, central, oral, buccal, combined).[2]

Why it is important: the tactics of opening the pulp chamber and the volume of odontopreparation are determined. In addition, the absence of communication with the pulp chamber allows for certain rational methods of endodontic treatment.

2. Detection of anomalies in the pulp cavity (coronal part).

2.1 Denticles.[7]

Why it is important: their location can complicate surgical access for endodontic treatment, which determines the tactics of odontopreparation.

3. Establishing the number of roots. [2]

3.1 Teeth with possible (occurring) variability in their number.

3.1.1. First premolar on the maxilla. More often there is one, but there may be two canals with a different number of constrictions in the apex.

3.1.2 Maxillary molars - occur with two (buccal ones are connected) and one root. In the latter case, the molar has only one canal. Anthropologists attribute such teeth to the Mongoloid race.

3.1.3. Third molars (wisdom teeth) - various options are possible.

3.2 Presence of a supernumerary root.

3.2.1 Most often molars, especially the upper jaw.

Why it is important: the number of roots mainly determines the number of main channels.

4. Characteristics of the number of root canals in a tooth or a specific root.

4.1. Number of channels. [12]

4.1.1. Corresponds to the anatomical indicators: one root, one canal.

4.1.2. Well-known options for the location of two canals in one root - for example, the medial root of the first and second molars of the lower jaw and the first premolar of the upper jaw with one root.

It is convenient to estimate the number of canals in three sections of an x-ray examination, especially for molars. For example, it has been established that the molars of the lower jaw can have different variants of the structure of the roots along the canals from two to four, while the variants of the anatomy of the canals of the system can vary from one to seven canals.

4.1.3 Atypical quantity.

It should be taken into account that the presence of lateral canals may be associated with periapical pathology. Recent studies indicate that accessory canals are common but play a small role in periradicular pathology.

Why it is important: the number of endodontic treatments performed depends on the number of root canals, i.e. scope of endodontics. An undetected (undetected) and, as a result, untreated channel will lead to undesirable consequences that will nullify the quality treatment of others. For high-quality tooth treatment during endodontics, it is imperative to detect all canals. This provides CT examination.

4.2 Internal resorption. [8]

Pathology is considered from the perspective of ICD-C. Diagnosed on the basis of x-ray examination.

Why it is important: certain tactics are required not only for endodontic treatment.

The treatment plan is largely determined by the class – ICD – C.

5. Tooth root assessment.

5.1 External resorption is considered in terms of ICD-C. [1] It is more common in cases of pulp necrosis and apical bone resorption, which can lead to loss of tapering in the structure. Radiation diagnostics reveal, unfortunately, only in 20% of cases.

Why it is important: it is considered as the main factor determining the advisability of endodontic treatment.

6. Apical characteristics of the canal.

6.1 Location. Traditionally, the apical end point of the canal location is set at 1 mm from the apical radiograph. At the same time, another researcher found that in 92% of the teeth studied, the apical narrowing was 0.5-1 mm from the apex. The results of this study showed deviation of the foramina relative to the apex in 76% of roots by microscopy and 57% by radiography; the average distance was 1 mm. In a subsequent study, it was found that no hole coincided with the long axis of the root, and the distance varied from 0.2 to 3.8 mm. Why it's important: a guideline for assessing the results of root canal filling. But it should be taken into account that identifying this before filling is problematic, but in some cases it is possible with a CT scan. In the latter case, this makes it possible to predict the outcome of the expected treatment.

6.2 Dimensions of constriction.[6]

Why it is important: it is an indicator for the tactics of choosing a method of dental care. Determines the filling technique and materials used (root sealant).

6.3 Form of constriction.

6.3.1 CONDITION OF APICAL CONSTRICTION (indicated only in the presence of identified pathology).

Why it's important: size -0.1-0.2mm is the norm. In the case of 0.3-2.0 pathology (open apex), some authors believe that this condition of the apical structure is 0.4 mm or more.

This occurs as a result of long-term chronic inflammation in the periodontium at the apical constriction. Dentin is destroyed and the apical foramen increases in size. The so-called open apex is formed.

To some extent, the condition resembles an open apex in developing teeth. However, these two conditions have significant differences.

In developing teeth, the root canal is wide and corresponds in size to the apical foramen.

In addition, the apical canal protects the tissues of the developing tooth from contact with osteoclasts, resorbing cells.

In permanent teeth, apical resorption most often occurs in response to microbial stimulation and is accompanied by an increase in the communication of the contents of the root canal system with the periodontium, which in turn increases resorption. A kind of vicious circle arises.

Why it is important - it determines the endodontic treatment plan, as well as the prognosis of its effectiveness.

7. CURVATURE OF TOOTH ROOTS AND CANALS AND THEIR SHAPE.[1]

7.1 View: S-shaped root canal (root)

C-shaped root canal (root)

Anomaly in the structure of the canal (root)

Why is it important (indicated in cases requiring the use of special endodontic instruments).

7.2 According to the shape of the location of the roots of the lateral teeth (molars): [5]

- bell-shaped;

- cylindrical;

- conical;

- barrel

Why it is necessary: this form determines the choice of endodontic instruments for quality treatment, especially in the area of barrel-shaped roots, although it has certain features for other forms.

8. Morphological form of the apical periodontium. [6, 7]

8.1 Fibrous.

8.2 Granulating.

8.3 Granulomatous.

8.4 Ankylosis.

8.5 Hypercementosis.

Why it's important: details the diagnosis form. This determines certain features of the treatment plan.

9. FILLING THE CHANNEL. Characteristics of endodontic treatment - the quality of filling (filling) is considered.[11]

9.1 - necrotic decay, putride masses;

9.2 - the level and quality of obturation of the root canal, especially in its apical part, determines the prognosis of treatment, root filling materials: (it has been filled).

- Meets the requirements;

- Underfilling;
- Resealing;
- Insufficient density of filling material;
- Voids in the channel;
- Presence of pins and fragments of endodontic instrumentation.

9.3 – stage of endodontic treatment.

- previously started treatment;
- periodontitis at the treatment stage;
- previously treated.

Lack of filling material in the apical third of the canal (underfilling). This is a common mistake that too often goes unnoticed. [11]

Refilling or removal of filling material beyond the apical holes. At the same time, moving the filling material beyond the apical foramen does not guarantee three-dimensional filling of the canal. Filling material - can extend beyond the root canal without providing hermetically sealed isolation of the apical foramen.

Insufficient density of the filling material in the apical part of the canal; the radiograph shows a low radiological density of the filling material in the apical part of the canal. Fuzzy contours of the canal, pores and voids in the filling material, as well as a violation of the fit to the canal walls are determined. The problem becomes more obvious when using root sealant with minimal radiopacity.

Some doctors use highly radiopaque root cements, as well as pins and sealants made of composite materials, which also have high radiopacity, which makes it possible to identify such errors when using them.

Voids in the canal after its final obturation. The reasons for the formation and methods for eliminating pores can be different. There is no obvious evidence that unfavorable treatment results can be directly related to the presence of voids and obturation defects in the canal.

In this case, it is necessary to distinguish between the stages of endodontic treatment.

Early treatment initiated (initiated) is a clinical diagnostic category meaning that the tooth has previously been treated by partial endodontic intervention, such as a pulpotomy or pulpectomy.

Periodontitis at the treatment stage - when there are medicinal pastes in the canal.

Previously treated - a clinical diagnostic category, which means that the tooth has previously been endodontically treated, and the root canals have been obturated with various filling materials, rather than intravenous materials.

P.S. This is important for evaluating the treatment performed. Of interest for forecasting. In modern literature, publications have appeared regarding complications specifically after quality treatment. In this regard, it should be noted that the concept of “quality obturation” needs to be rethought. Attempts have been made to explain this

phenomenon. The authors consider residual infection of the root canal system to be the main cause of complications.[7]

10. Perforation: we consider it necessary to highlight and detail in a separate class the characteristics (according to assessment) of endodontic root perforations, this is due to the type of pathology encountered in healthcare.

10.1 Presence of perforation.[10]

10.2 By localization:

- estuarine - in the area of the root canal mouth;
- median – in the middle third of the root;
- apical – in the apical third of the root;
- apical – at the root apex.

This significantly determines the tactics for choosing a root sealant, and in many ways the assessment of its status.

11. Problems of assessing recovery, success and failure. [13]

According to the European Society of Endodontology (ESE) guidelines, regular monitoring is required for 4 years. First control in a year.

ESE criteria based on radiological examination results.

11.1. Full recovery.

Ro: Definitions of a continuous periodontal gap of normal width (i.e. Ro signs of bone regeneration).

11.2. Not a complete recovery.

Ro determined reduction of lesions due to pulp disease.

11.3. Lack of recovery.

Absence of Ro signs, reduction of periapical etiology, sometimes the formation of a new periradicular lesion and (or) Ro confirmed progressive external resorption.

Conclusion.

Analysis of the identified pathology according to radiation examination data for periodontitis according to the proposed protocol allows you to select the necessary diagnostic technique and avoid erroneous interpretation of the study results.

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