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PREVENTION OF ERRORS AND COMPLICATIONS AT THE STAGES OF ENDODONTIC TREATMENT

Turumova Marjona Bahodir kizi
Assistant of the Department of Orthopedic Stomatology of
SamSMU Samarkand, Uzbekistan

A B S T R A C T

The article examines the main errors and complications that occur at different stages of endodontic treatment, as well as methods for their prevention. The relevance of the study is due to the high prevalence of endodontic interventions and a significant frequency of failures associated with anatomical features of the root canals, technical errors, and insufficient adherence to clinical protocols. The purpose of the study was to analyze the causes of endodontic errors and to develop preventive measures aimed at improving the effectiveness and safety of treatment. The work used clinical observation data, results of radiological and instrumental diagnostic methods, as well as analysis of modern scientific sources.

K E Y W O R D S

Endodontic treatment; errors and complications; prevention; root canals; instrumental treatment; irrigation; obstruction.

INTRODUCTION

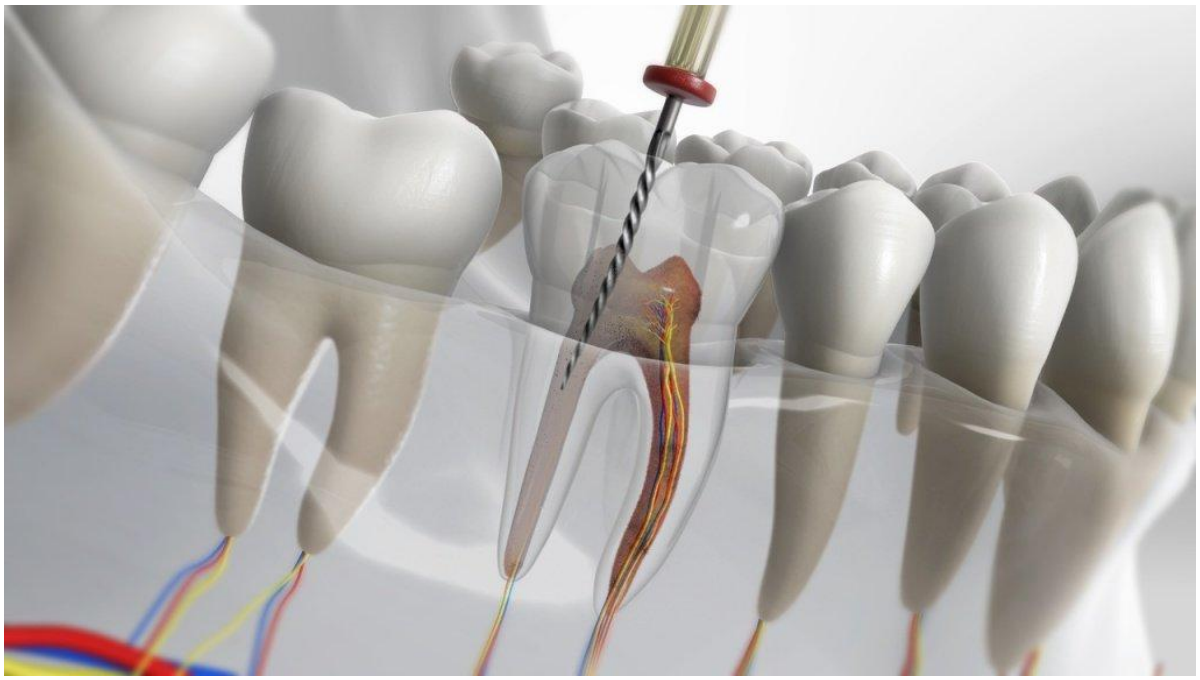
Endodontic treatment of pulpitis and periodontitis requires complex dental manipulations. The basis for effective treatment is the highly qualified physician, the optimal use of modern instruments and materials, and strict adherence to their application methods. The reasons for the decline in the quality of root canal filling are medical errors made during the stages of endodontic treatment. The latter can be conditionally divided into three groups.

- Providing access for root channel processing.
- Direct canal treatment (mechanical and medication).
- Proper root canal filling.

The quality of cavity filling also affects the results of endodontic treatments. Errors in tooth restoration can contribute to the disruption of adhesion at the filling-tooth interface, increased occlusion, and pigmentation of the crown.

The dentin of the tooth root contains many dentinal tubules with a diameter of about 800 nm, the number of which is on average 20,000 per 1 mm2. The tubules extend from the pulp to the periphery, carrying out the trophic and sensory functions of the pulp. During endodontic treatment of pulpitis or periodontitis of the teeth (when the pulp is removed or no longer viable), after instrumental and medicinal treatment of the root canal, there are openings of dentinal tubes in its walls. In them, pathogenic microflora can subsequently multiply, causing complications (acute or chronic

periodontitis) in poor-quality root canal obstruction with filling material. According to F. Figdor (2002), the estimated annual number of ineffective treatment cases of pulpitis and periodontitis is approximately 4 million in Sweden, 7 million in Australia, and 120 million in the USA.



It is believed that with high-quality filling of the root canal, the filling material obstructs the dentinal tubules and, if it has antimicrobial properties, prevents the development of pathogenic microflora in them. However, clinical experience shows that even a high-quality root canal filling does not prevent complications. A method of additional dentin tube obstruction using adhesive systems, used to increase the adhesion of fillings to the walls of the carious cavity in the treatment of caries (prototype), is known (Vinnichenko, Yu.A. The method of blocking infected root dentin using the Etch & Prime 3.0 adhesive system in the treatment of pulp and periodontal diseases in children and adults. - New in dentistry. - 2001. - No. - P.25-27).

The indicated method consists of instrumental and medicinal treatment of the root canal of the tooth, after which its walls are treated once with the adhesion system "Etch & Prime 3.0." In this case, the adhesive covers the surface of the dentin, penetrates open dentinal tubules to a depth of 2-5 μm, and chemically polymerizes in them, thereby ensuring the obstruction of the dentinal tubules. After this, the root canal is sealed using known methods using sealing materials.

The disadvantages of the prototype are the following. The penetration depth of the adhesive into the tubes is only 2-5 μm. Considering that the adhesive also covers the dentin surface in the form of a thin film, there is a high risk of condensation of the filling material during the filling of the adhesive layer displacement channel with simultaneous removal of the polymerized adhesive "spikes" from the dentinal tubule lumen and their exposure.

Excessive lateral expansion of the channel along the inner or outer curvature occurs when processing curved root channels using rigid, inflexible files; excessive expansion of narrow curved channels, as well as underestimation of the degree of root curvature. Due to excessive removal of dentin, not only does the tooth's resistance to mechanical stress decrease, but there is also a risk of longitudinal perforation of the root canal wall. Prevention measures for excessive longitudinal dilation involve

preliminary study of the degree of root canal curvature and assessment of wall thickness based on radiological examination data.

It is recommended to pre-bend the endodontic tools, apply the methodology, preferably treating the walls along the external curvature, and use secure files. Expansion of narrow, curved channels should be carried out no more than by 2-4 numbers compared to the original size.

The proposed method has the following advantages. Deep fluoridation of the tooth root canal walls allows for reliable, deep obstruction of the dentinal tubes opening into the canal cavity. When the canal is subsequently sealed, the tubes remain closed. Therefore, even with poor-quality obstruction of the root canal with a filling material (as a result of material shrinkage, technical or medical error), the fluid is not washed out of the dentinal tubules by tissue fluid, hinders the development of microflora for a long time due to prolonged antimicrobial action, and contributes to the remineralization of peritubular dentin. Due to these effects, the risk of periodontitis development is significantly reduced.

The proposed method, based on the results of long (5+ years) clinical observations, allows for a 32% reduction in the number of complications after endodontic treatment of dental pulpitis and periodontitis, i.e., by the same amount, increases the effectiveness of the treatment.

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