

MODERN PROBLEMS IN ENDODONTICS

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Abstract. This article addresses problematic issues in endodontics. A current perspective is presented on the principles and stages of endodontic crown and root preparation for the prevention of errors. Recommendations for high-quality endodontic treatment are provided.

Keywords: problems, errors, endodontic preparation (coronal and root), prevention, recommendations.

Despite numerous studies and publications, the treatment of complicated caries—pulpitis and periodontitis—remains an important and pressing issue in modern dentistry. Unfortunately, apical periodontal disease is one of the main reasons for tooth extraction. Furthermore, teeth with apical periodontitis often cause odontogenic inflammatory processes in the body due to destructive processes at the root apex.

In recent years, increasing attention has been paid to the quality of endodontic treatment. This is no coincidence: it is no secret that the current situation with the provision of such care to the population in our country is disappointing. This is partly due to the fact that many dentists consider this pathology in isolation from the condition of the surrounding tooth tissues and without assessing it. The main etiological factor of apical periodontitis—microbial invasion and reservoirs of infection in the oral cavity—is not always taken into account. The existing relationship between the functional and morphological unity between dental tissues, the periodontium, and the body as a whole cannot be ignored. As is well known, the oral cavity is a unique part of the body, always containing various strains of bacteria (both beneficial and aggressive).

Problem issues in endodontics.

Problems in endodontics. A modern view of evidence-based dentistry regards dental plaque (biofilm) as a collection of various bacterial strains designed to coexist, which may include both non-cariogenic and cariogenic bacteria. Scientifically proven evidence of the pathogenic role of biofilm forms the foundation for uncovering the mechanisms of oral disease development, including caries and its complications [1, 3, 10]. At the same time, low patient awareness of oral care rules, and late diagnosis of diseases, gingivitis, and early forms of caries contribute to the development of irreversible forms of pulpitis or apical periodontitis [3, 8]. From this perspective, the main goal of endodontic treatment is to influence the biofilm to reduce the number and eliminate pathogenic microorganisms in the affected tooth and surrounding tissues, as well as to prevent reinfection of the root canal system. Endodontic treatment requires a fundamental understanding of the steps involved in crown and root endodontic preparation for each tooth, adequate disinfection, and high-quality root canal obturation under radiographic guidance [1, 3, 10, 11]. **Abstract.** This article highlights problematic issues in endodontics. A modern perspective is presented on the principles and stages of crown and root endodontic preparation to prevent errors. Recommendations for high-quality endodontic treatment are provided.

Keywords: problems, errors, endodontic preparation (crown and root), prevention, recommendations.

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Summary. This article presents information about the most common problem in endodontology. In clinical practice, were described the basic rules and principles of endodontic cavity preparation (coronal and root canals) for preventing errors. The authors provide the main recommendations for quantitative endodontically treated teeth.

Keywords: errors, performance, preparation of coronal and root canals, prevention of problems, recommendations. Evidence presented by many scientists indicates that approximately 60% of endodontic treatment failures are directly related to incomplete obturation of the root canal system, which are part of the radicular space [5, 10, 11]. This can subsequently lead to various inflammatory diseases of the maxillofacial region and the formation of focal lesions in systemic organs. The complexity of endodontic treatment lies in the fact that a great deal of work must be done in a small space, which is largely unobservable.

However, along with the objective difficulties and failures of endodontic treatment, it is essential to be aware of the errors and complications that may arise during examination, diagnosis, and endodontic crown and root preparation, as well as methods for preventing them to preserve tooth function and the patient's overall health. In recent years, thanks to the introduction of new technologies, instruments, and materials into endodontic practice, positive trends have been observed in increasing the effectiveness of endodontic dental treatment.

However, this does not mean that in clinical practice of dentists, the number of unsuccessful treatment outcomes for complicated caries has currently decreased.

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- 1) the anatomical features of each tooth and its characteristics (location of cusps, roof and size of the pulp chamber, canal orifices, their diameters, number and size, curvature, etc.);
- 2) distinctive features of teeth in three projections, taking into account age;
- 3) the anatomical and topographic structure of the root canal system;
- 4) detailed diagnostic methods for the affected tooth;
- 5) assessment of the condition of the periodontal tissues surrounding the tooth and the OHI-S, KPI, and KPU indices.

Three components guarantee effective endodontic treatment and its prognosis: good oral hygiene, high-quality mechanical preparation followed by obturation of the root canal system, and restoration of the tooth's anatomical shape.

Despite the variety of reasons for which errors are made during endodontic treatment, they are based on violations of the algorithm for preparing the crown portion of the tooth and root canals, which leads to the development of complications [3, 11]. Radiographic data show that root canals are filled satisfactorily in approximately 13.4% of cases [4]. It is known that teeth with poorly filled root canals are sources of chronic odontogenic infection, which can cause changes of varying severity in other organs (Fig. 1). Typically, this is caused, on the one hand, by virulent microorganisms and their toxins, which are found in the affected dentinal tubules of the tooth root, and on the other, by the leakage of tissue fluid from the apical foramen [11]. It is precisely as a result of microleakage

of decay products through the apical foramen and lateral tubules of the tooth root that foci of inflammation form in the surrounding periodontal tissues (periradicular inflammation) [11]. Of significant importance is the term "pulp space," which includes the pulp chamber of the crown of the tooth and the root canal with all its branches. The structure of the pulp space can be altered due to the deposition of secondary, tertiary dentin, or formation of denticles and calcifications. It is important to consider that the connection between the pulp and the periodontium is realized not only through the main canals, but also through accessory tubules (lateral), which can serve as a reservoir of infection due to poor antiseptic treatment of the canal or without the use of sealers.

In the apical third, deltoid branching in the form of additional tubules, the so-called apical delta, is typically found. This must be taken into account to prevent errors during endodontic treatment [2, 8, 11]. In practical endodontics, clinicians most often encounter difficulties during the stages of work in the coronal portion of the tooth and root canals. This is primarily due to the fact that the domestic literature

lacks information on the rules for performing the stages of endodontic crown preparation, and lacks information on the characteristic features of each tooth in three projections [8, 9, 11].

Knowledge of the dental features characterizing the first projection, which is determined radiographically, as well as an assessment of the anatomical and topographic parameters help to avoid errors in work during the examination stages

of both the coronal and root portions of the tooth [2, 11]. To avoid errors in the treatment of complicated caries (pulpitis or apical periodontitis), endodontic preparation of the crown and root portions of the tooth using appropriate instruments under antiseptic control is crucial [1, 5].

The intended purpose of each stage of endodontic preparation helps prevent errors and complications. From this perspective, it is essential to know and understand the purpose and stages of crown preparation, including key issues: preparing access to the roof of the pulp chamber for its complete removal (according to indications for amputation of the coronal pulp), shaping the walls and floor of the pulp chamber, taking into account the topography of the main transition to the root canal orifice (e.g., in the shape of a triangle or diamond in upper and lower molars) [2, 11]. Mastering the skills of endodontic crown preparation for each tooth will undoubtedly help reduce the risk of possible errors in subsequent stages of work. However, this does not mean that in clinical practice of dentists, the number of unsuccessful treatment outcomes for complicated caries has currently decreased.

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