

INNOVATIVE APPROACHES IN ENDODONTIC TREATMENT

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Abstract

This article reviews modern and innovative approaches in endodontic treatment, focusing on advanced technologies, materials, and techniques that improve clinical outcomes. Contemporary endodontics has evolved significantly with the introduction of digital imaging, rotary instrumentation, and biocompatible materials. These advancements enhance treatment efficiency, reduce complications, and increase the success rate of root canal therapy.

Keywords

endodontics, root canal treatment, rotary instruments, irrigation, obturation, bioceramics, innovation.

Introduction

Endodontics is a specialized branch of dentistry that deals with the diagnosis and treatment of diseases affecting the dental pulp and periapical tissues. Traditional endodontic methods, although effective, often require long treatment time and may be associated with procedural errors.

In recent years, technological advancements have transformed endodontic practice, introducing innovative tools and techniques that improve precision, safety, and patient comfort. This article aims to explore modern approaches in endodontic treatment and their clinical significance.

Main Part

1. Advances in Diagnostic Technologies

Modern endodontics relies heavily on accurate diagnosis. Cone-beam computed tomography (CBCT) has become an essential tool, providing three-dimensional imaging of dental structures. It allows clinicians to detect root canal morphology, periapical lesions, and anatomical variations more precisely than conventional radiography.

2. Rotary and Reciprocating Instrumentation

The introduction of nickel-titanium (NiTi) rotary and reciprocating instruments has revolutionized root canal preparation. These instruments offer:

- greater flexibility;
- improved shaping ability;
- reduced risk of canal transportation and instrument fracture.

They significantly decrease treatment time while maintaining high efficiency.

3. Irrigation Techniques and Solutions

Effective irrigation is crucial for eliminating microorganisms and debris from the root canal system. Modern irrigation methods include:

- passive ultrasonic irrigation (PUI);
- sonic activation systems;
- negative pressure irrigation.



Commonly used irrigants include sodium hypochlorite, EDTA, and chlorhexidine, which enhance disinfection and smear layer removal.

4. Advanced Obturation Methods

Obturation is a critical step in endodontic therapy. New techniques aim to achieve a hermetic seal of the root canal system. These include:

- warm vertical compaction;
- thermoplasticized gutta-percha techniques;
- carrier-based obturation systems.

Bioceramic sealers have gained popularity due to their excellent sealing ability, biocompatibility, and antibacterial properties.

5. Use of Magnification and Microscopy

Dental operating microscopes and magnification tools have significantly improved the visualization of root canal systems. They help in detecting additional canals, managing complex anatomy, and performing minimally invasive procedures with greater precision.

6. Regenerative Endodontics

One of the most promising innovations is regenerative endodontics, which aims to restore the vitality of damaged pulp tissue. Techniques involve the use of stem cells, growth factors, and scaffolds to promote tissue regeneration and root development.

Conclusion

Innovative approaches in endodontic treatment have significantly improved the quality and success rate of dental care. The integration of advanced diagnostic tools, modern instrumentation, and biocompatible materials allows for more predictable and efficient treatment outcomes. Continuous research and technological development will further enhance the future of endodontics.

REFERENCES

1. Khayitova, M. Z. (2024). Modern views on the Causes and Treatment of Caries of Temporary Teeth in Young Children. *International Journal of Alternative and Contemporary Therapy*, 2(9), 123-127.
2. Khayitova, M. D. (2024). Morphological Features of Bottle (Circular) Caries. *American Journal of Bioscience and Clinical Integrity*, 1(10), 117-124.
3. Dzhuraevna, K. M. (2024). Features of Caries Morbidity in Preschool Children. *Research Journal of Trauma and Disability Studies*, 3(3), 300-305.
4. Hayitova, M., & Taylakova, D. (2023). DENTAL CARIES IS A DISEASE OF CIVILIZATION. *Центральноазиатский журнал образования и инноваций*, 2(8), 61-66.
5. Джураевна, К. М. (2024). Клинико-морфологические аспекты трещин на задних зубах у взрослых. *Научный журнал травматологии и инвалидности*, 3 (5), 429-432.
6. Dzhuraevna, K. M. (2024). Prevalence and Course of Dental Diseases Among Younger Patients. *Research Journal of Trauma and Disability Studies*, 3(5), 433-436.
7. Хайитова, М. Д. (2023). Особенности Возникновение И Течение Кариеса Зубов. *Research Journal of Trauma and Disability Studies*, 2(12), 356-363.
8. Хайитова, М., & Тайлакова, Д. (2023). ВЗГЛЯД СТОМОТОЛОГА НА ГИГЕНУ ПОЛОСТИ РТА У ДЕТЕЙ. *Инновационные исследования в современном мире: теория и практика*, 2(23), 58-59.



9. Хайитова, М. Д. (2023). РАСПРОСТРАНЕННОСТЬ И РАСПРЕДЕЛЕНИЕ ТРЕЩИН НА ЗАДНИХ ЗУБАХ СРЕДИ ВЗРОСЛЫХ ПАЦИЕНТОВ (ОБЗОР ЛИТЕРАТУРЫ). *Лучшие интеллектуальные исследования*, 12(1), 186-195.
10. Dzhuraevna, K. M. (2024). Clinical and Morphological Aspects of Cracks on The Back Teeth in Adults. *Research Journal of Trauma and Disability Studies*, 3(5), 429-432.
11. Dzhuraevna, K. M. (2023). THE FREQUENCY OF DENTAL DISEASES IN CHILDREN (LITERATURE REVIEW). *Лучшие интеллектуальные исследования*, 12(1), 159-168.
12. Dzhuraevna, K. M. (2023). FEATURES OF THE OCCURRENCE OF DENTAL DISEASES IN CHILDREN. *Лучшие интеллектуальные исследования*, 12(1), 178-185.
13. Khayitova, M. (2025). GUIDELINES FOR DENTAL EMERGENCIES DURING A PANDEMIC. *Modern Science and Research*, 4(1), 827-835.
14. Хайитова, М. (2025). СТОМАТОЛОГИК КАСАЛЛИКЛАР ПРОФИЛАКТИКАСИДА ФТОР САКЛОВЧИ БИРИКМАЛАРНИНГ АХАМИЯТИ. *Современная наука и исследования*, 4 (2), 1055–1065.
15. Тошбеков Б. и Хайитова М. (2025). ТИШ КАРИЕСИ ПРОФИЛАКТИКАСИНИНГ ИНСОН ОРГАНИЗМИДАГИ АХАМИЯТИ. *Современная наука и исследования*, 4 (2), 591–594.
16. Khayitova, M. (2025). TISH YUZASIDA HOSIL BOLADIGAN KARASHLAR VA TOSHLAR (ШОКМАЛАР). *Modern Science and Research*, 4(3), 1405-1412.
17. Хайитова, М. (2025). ТИШ КАТТИК ТО'КИМАСИ РЕМИНЕРАЛИЗАЦИЯ КАРИЕС ПРОФИЛАКТИКАСИДАГИ О'РНИ. *Современная наука и исследования*, 4 (4), 1801–1806 гг.
18. Khayitova, M. (2025). BOLALARDA KARIES PROFILAKTIKASIDA FISSURALARNI MUHRLASH VA ULARNING АНАМИЯТИ. *Modern Science and Research*, 4(5), 504-507.

