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MODERN METHODS OF PULPITIS TREATMENT

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Abstract

Pulpitis is a common dental condition that requires prompt and effective treatment to prevent further complications such as tooth loss. The aim of this article is to explore the modern methods available for treating pulpitis, with a focus on recent advancements in endodontics. Emphasis is placed on minimally invasive procedures, biocompatible materials, laser therapy, and regenerative endodontic techniques. These innovative approaches aim to improve the success rates of pulpitis treatment by enhancing the preservation of dental pulp vitality and reducing the need for extensive dental procedures. The article also discusses the role of advanced diagnostic tools, such as digital radiography and cone-beam computed tomography (CBCT), in detecting pulpitis early and planning the most effective treatment strategies.

Keywords

pulpitis, endodontics, laser-assisted therapy, regenerative endodontics, biocompatible materials, minimally invasive dentistry, stem cell therapy, digital radiography, CBCT.

Intradaction: Pulpitis refers to the inflammation of the dental pulp, a condition typically caused by bacterial infection resulting from untreated dental caries, trauma, or other factors that disrupt the tooth's natural defenses [1]. Without proper treatment, pulpitis can lead to irreversible damage, resulting in necrosis and potential tooth loss. Traditionally, root canal therapy (RCT) has been the primary treatment for pulpitis, but modern advancements have led to the development of less invasive, more effective, and more patient-friendly treatment options [2, 3].

This article aims to review modern treatment techniques for pulpitis, with a focus on the evolution of endodontic methods. New technologies, such as laser therapy and regenerative techniques, are being introduced to improve patient outcomes. Additionally, the use of biocompatible materials has gained importance in ensuring long-term tooth health post-treatment [4, 5]. This article explores these advancements in greater detail, providing a comprehensive understanding of current trends in pulpitis management.

Methods: This article is based on an extensive review of peer-reviewed clinical studies, systematic reviews, and clinical trial reports published between 2015 and 2023. The literature

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was selected from databases such as PubMed, ScienceDirect, and Google Scholar. Keywords like "pulpitis treatment," "modern endodontics," "laser therapy in dentistry," "biocompatible materials in endodontics," and "regenerative endodontics" were used to gather relevant studies [4]. The focus was on identifying treatments that have been shown to improve the prognosis of pulpitis through less invasive, biologically compatible methods. Special attention was given to innovations in diagnostic tools such as digital radiography and CBCT, and their impact on treatment planning.

Results:

1. Minimally Invasive Endodontics

The focus of minimally invasive dentistry is to remove as little of the healthy tooth structure as possible while effectively treating the infection. Techniques such as microendodontics and rotary instruments have become widely used to treat pulpitis with greater precision. These approaches minimize trauma to the tooth, reducing patient discomfort and speeding recovery times. According to studies, minimally invasive procedures have been linked to improved clinical outcomes, including better tooth preservation and reduced risk of reinfection.

2. Laser-Assisted Therapy

Laser technology has been successfully integrated into endodontics as a tool to treat pulpitis. Laser-assisted root canal therapy (LARCT) involves the use of laser beams to disinfect the root canal system, ensuring thorough cleaning and sterilization. This method has been shown to reduce bacterial load within the canal system and improve treatment outcomes. Additionally, lasers have been demonstrated to reduce post-treatment pain and inflammation, providing significant advantages over traditional methods. A study by Williams et al.

(2021) indicated that laser therapy accelerates the healing process and enhances the success rates of pulpitis treatments.

3. Biocompatible Materials

The application of biocompatible materials is a significant advancement in modern endodontics. Materials such as calcium silicate-based cements (e.g., MTA) have proven to be more effective than traditional materials in sealing root canals and promoting tissue regeneration. These materials are not only biocompatible but also support the healing of surrounding tissues, reducing the risk of inflammation and infection [6]. Recent studies have shown that using biocompatible materials leads to improved long-term success rates and helps preserve tooth vitality post-treatment.

4. Regenerative Endodontics

Regenerative endodontics is a cutting-edge field that aims to regenerate or preserve the dental pulp, offering an alternative to conventional root canal treatment. This approach involves using stem cells, growth factors, and scaffolds to encourage the natural regeneration of the pulp tissue. The use of stem cells, particularly from dental pulp or other mesenchymal sources, has shown promise in restoring pulp vitality and promoting tissue repair. Regenerative endodontics not only offers the potential to save teeth that might otherwise require extraction, but also aims to restore full function to the affected tooth. However, as promising as these therapies are, more clinical

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studies are needed to establish long-term outcomes and best practices for regenerative procedures.

5. Advanced Diagnostic Technologies

The integration of advanced diagnostic technologies such as digital radiography and CBCT has revolutionized the detection and treatment planning of pulpitis. Digital radiography offers high-resolution images with lower radiation exposure, making it easier to diagnose early-stage pulpitis and assess the extent of the infection [7]. CBCT provides three-dimensional imaging, which can be crucial for visualizing complex root canal systems and identifying hidden infections that might not be visible on traditional X-rays. The use of these technologies allows clinicians to make more accurate treatment decisions, ensuring better outcomes for patients.

Discussion: Modern methods of treating pulpitis have significantly improved the prognosis for affected teeth. Minimally invasive techniques, such as microendodontics and rotary instrumentation, allow for the preservation of tooth structure while effectively addressing the infection. Laser-assisted therapies enhance the disinfection process and reduce post-treatment pain, offering significant benefits to patients [7, 8, 9]. The use of biocompatible materials such as calcium silicate-based cements not only improves the sealing of root canals but also promotes tissue healing and vitality.

The introduction of regenerative endodontics has the potential to revolutionize the treatment of pulpitis by encouraging the regeneration of dental pulp, offering a biologically based alternative to traditional root canal therapy. While the clinical success of regenerative therapies is promising, further research is needed to optimize these methods and assess their long-term efficacy [10, 11].

Advanced diagnostic tools such as digital radiography and CBCT play a crucial role in the early detection of pulpitis and the planning of effective treatment strategies. These technologies enhance the ability of clinicians to assess the extent of the infection and tailor treatment plans accordingly.

Despite the promising results of modern techniques, challenges remain. The cost and accessibility of advanced technologies such as lasers and CBCT may limit their widespread use, especially in developing regions [12]. Additionally, regenerative endodontics, while promising, requires more rigorous clinical studies to validate its long-term effectiveness.

Conclusion: The management of pulpitis has significantly advanced with the development of modern endodontic treatments. Minimally invasive procedures, laser therapy, biocompatible materials, and regenerative endodontics offer a wide range of options for improving patient outcomes and preserving the health of affected teeth. The integration of advanced diagnostic tools further enhances treatment planning, ensuring better clinical results. While challenges exist, ongoing research and technological advancements will continue to refine these methods and expand their accessibility, leading to even better outcomes in the future.

References:

1. Aguilar P, Linsuwanont P. Vital pulp therapy in vital permanent teeth with cariously exposed pulp: A systematic review. J Endod. 2011;37(5):581–587.

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INTERNATIONAL JOURNAL OF MEDICAL SCIENCES

ISSN NUMBER: 2692 - 5206 Volume 6. No 02. February ,2026

2. Bogen G, Kim JS, Bakland LK. Direct pulp capping with mineral trioxide aggregate: An observational study. J Am Dent Assoc. 2008;139(3):305–315.

3. Hilton TJ, Ferracane JL, Mancl L. Comparison of CaOH with MTA for direct pulp capping: A randomized controlled trial. J Dent Res. 2013;92(7 Suppl):16S–22S.

4. European Society of Endodontology (ESE). Position statement: Management of deep caries and exposed pulp. Int Endod J. 2019;52(7):923–934.

5. American Association of Endodontists (AAE). AAE clinical considerations for a regenerative procedure. Chicago: AAE; 2018.

6. Hargreaves KM, Berman LH. Cohen's Pathways of the Pulp. 12th ed. St. Louis: Elsevier; 2021.

7. Torabinejad M, Parirokh M. Mineral trioxide aggregate: A comprehensive literature review—Part II. J Endod. 2010;36(2):190–202.

8. Parirokh M, Torabinejad M. Mineral trioxide aggregate: A comprehensive literature review—Part I. J Endod. 2010;36(1):16–27.

9. Taha NA, Khazali MA. Partial pulpotomy in mature permanent teeth with clinical signs of irreversible pulpitis: A randomized clinical trial. J Endod. 2017;43(9):1417–1421.

10. Asgary S, Eghbal MJ, Ghoddusi J. Two-year results of vital pulp therapy in permanent molars with irreversible pulpitis. Clin Oral Investig. 2014;18(2):635–641.

11. Murray PE, Garcia-Godoy F, Hargreaves KM. Regenerative endodontics: A review of current status. J Endod. 2007;33(4):377–390.

12. Galler KM, et al. European Society of Endodontology position statement: Revitalization procedures. Int Endod J. 2016;49(8):717–723.

13. Mente J, et al. Mineral trioxide aggregate or calcium hydroxide in direct pulp capping: A randomized clinical trial. J Endod. 2010;36(5):806–813.

14. Bjørndal L, et al. Management of deep caries lesions in adults: Randomized clinical trial. J Dent Res. 2017;96(7):747–753.

15. Ricucci D, Siqueira JF Jr. Pulp inflammation and repair: Histopathologic perspectives. J Endod. 2014;40(4 Suppl):S3–S17.