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Editorial

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Regenerative Endodontics, Bio ceramics and Pulp Revitalization

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Introduction

Regenerative endodontics is an emerging field that aims to restore the biological function of the dental pulp rather than simply replacing it with inert filling materials. Traditional root canal therapy effectively eliminates infection but results in a non-vital tooth that may become brittle over time. In contrast, regenerative endodontic procedures seek to promote pulp revitalization, continued root development, and restoration of normal tissue function. The use of bioceramic materials has significantly advanced regenerative endodontics due to their biocompatibility, bioactivity, and sealing ability [1,2].

Discussion

Pulp revitalization is a key objective of regenerative endodontic therapy, particularly in immature permanent teeth with necrotic pulps and open apices. These cases present clinical challenges for conventional endodontic treatment because incomplete root development compromises tooth strength. Regenerative procedures aim to stimulate the growth of new tissue within the root canal system, allowing continued root maturation and thickening of dentinal walls [3,4].

The regenerative process typically involves thorough canal disinfection, followed by the induction of bleeding into the canal space to create a blood clot that serves as a natural scaffold. This scaffold provides a source of stem cells, growth factors, and signaling molecules that support tissue regeneration. In some protocols, platelet-rich plasma or platelet-rich fibrin is used to enhance regenerative potential [5].

Bioceramic materials play a critical role in regenerative endodontics. Materials such as mineral trioxide aggregate and newer calcium silicate–based cements are widely used due to their excellent sealing properties and ability to stimulate hard tissue formation. Bioceramics are highly biocompatible and promote the release of calcium ions, which support mineralization and tissue healing. Their alkaline pH also provides antimicrobial effects, contributing to a favorable environment for regeneration.

Clinical studies have shown that regenerative endodontic procedures can result in resolution of apical pathology, increased root length, and thickened canal walls. However, outcomes can be variable, and the regenerated tissue may not be identical to native pulp. Factors such as patient age, infection control, and case selection significantly influence success.

Conclusion

Regenerative endodontics represents a paradigm shift from conventional root canal therapy toward biologically based treatment aimed at pulp revitalization. The incorporation of bioceramic materials has enhanced the predictability and success of these procedures by supporting tissue healing and regeneration. As research advances and clinical protocols continue to evolve, regenerative endodontics holds great promise for preserving tooth vitality and improving long-term outcomes in endodontic care.

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