

REVIEW ARTICLE

A PEEK INTO THE WORLD OF REGENERATIVE ENDODONTICS

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ABSTRACT

Despite the dental profession's emphasis on prevention, threats to pulp survival such as caries, restorative dental treatment, and traumatic injuries have not been eliminated. As a consequence, teeth are lost prematurely, and procedures aimed at preventing and treating pulp disease in the primary and immature permanent dentitions remain an integral part of contemporary dental practice. In the infected immature tooth with periapical involvement, pulp revascularization has been considered impossible due to the presence of bacteria in the root canal space and the lack of vital pulp progenitor cells necessary for the proliferation of pulpal tissue. From a biologic perspective, the goal of Endodontics is to prevent or treat apical periodontitis. An optimal way to accomplish this goal is to either maintain pulpal health in cases of pulpal inflammation or to regenerate healthy pulpal tissue in cases of pulpal necrosis.¹

INTRODUCTION

The current practice in treatment of Immature Young permanent teeth with necrosed pulp include apexification, Apexogenesis and maturogenesis. 'Apexification'², or root-end closure, is the process whereby a non-vital, immature, permanent tooth which has lost the capacity for further root development is induced to form a calcified barrier at the root terminus. This barrier forms a matrix against which root canal filling or restorative material can be compacted with length control. Unlike the pulp capping, pulpotomy, and Apexogenesis procedures, apexification will at best result in closure of the root end and cannot be expected to cause further root development in terms of length or wall thickness. Apexification is thus regarded as a treatment of last resort in immature teeth which have lost pulp vitality. Apexogenesis is defined as a vital pulp therapy procedure performed to encourage continued physiologic development and formation of the root end, whereas maturogenesis is the desired outcome of

revascularization procedures which sets the stage for physiologic root development, the term that best describes revascularization outcomes.^{1,2,3}

DISCUSSION

Theoretically, when an extremely large communication from the pulp space to the periapical tissues exists, as with a very young tooth, it may be possible for periapical disease to be present when the pulp is only partially necrotic and infected. Vital pulp may still be present in the most apical part of the canal. If this were the case, successful removal and disinfection of the necrotic infected coronal pulp would still leave vital pulpal cells with the potential to proliferate new pulp into the coronal pulp space. Thus obturation of the root canal space, temporarily with a medicament or with gutta-percha, would remove the possibility for revascularization to occur and thus be counterproductive.¹ Regenerative dental procedures are emerging as a vital, evolving field of dental care. The regeneration of oral tissues affected by inherited disorders, trauma and neoplastic/infectious disease is expected to solve many problems.¹

'Regenerative endodontic' procedures can be defined as biologically based procedures, designed to predictably

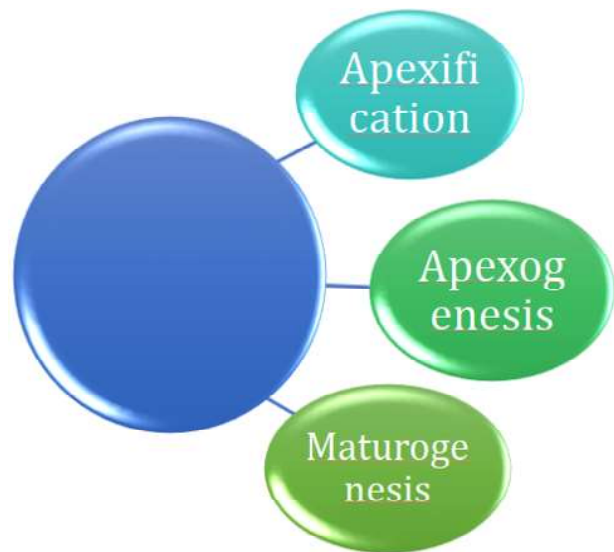


Fig. 1: Schematic representation depicting the three currently used treatment modalities for young permanent teeth.

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replace damaged, diseased, or missing structures, including dentin and root structures as well as cells of the pulp dentin complex with live viable tissues preferably of the same origin that restore the normal physiologic functions of the pulp dentin complex.^{1,7}

Pioneering work supporting the concept of regenerating dental tissues was reported more than 50 years ago when Dr. B.W. Hermann^{1,2} described the application of calcium hydroxide (Ca[OH]2) for vital pulp therapy, and Professor Nygaard Østby evaluated a revascularization method for reestablishing a pulp- dentin complex in permanent teeth with pulpal necrosis.

CONCLUSION

From the beginning of 21st Century, we are seeing the potential of regenerative Endodontics. The novel approach to restore tooth structure is based on biology i.e., regenerative endodontic procedures by the application of tissue engineering. Within the next upcoming years, unparalleled advances in dentistry and Endodontics are set to take place, with the availability of artificial teeth, bone, organs, and oral tissues; as well as the ability to stimulate endodontic regeneration.

SOURCE OF SUPPORT: NIL

CONFLICT OF INTEREST: NIL

REFERENCES

1. **Murray PE, Garcia-Godoy F, Hargreaves KM:** Regenerative endodontics: a review of current status and a call for action. *J Endod* 33:377, 2007.
2. **Rafter, M.** (2005), Apexification: a review. *Dental Traumatology*, 21: 1–8. doi: 10.1111/j.1600-9657.2004.00284.x
3. **Huang GT.** Apexification: the beginning of its end. *Int Endod J.* 2000;42:855–866
4. **Tuna, E. B., Dinçol, M. E., Gençay, K. and Aktören, O.** (2011), Fracture resistance of immature teeth filled with BioAggregate, mineral trioxide aggregate and calcium hydroxide. *Dental Traumatology*, 27: 174–178. doi: 10.1111/j.1600-9657.2011.00995.x
5. **Cvek M.** Prognosis of luxated nonvital maxillary incisors treated with calcium hydroxide and filled with gutta-percha. A retrospective clinical study. *Endod Dent Traumatol* 1992;8:45–55
6. **Iwaya S, Ikawa M, Kubota M.** Revascularization of an immature permanent tooth with apical periodontitis and sinus tract. *Dent Traumatol* 2001; 17: 185–187
7. **Deepak B.S., Nandini D.B. & S. Naik;** Tissue Engineering: Is it the future of Endodontics?; *People's Journal of Scientific Research*, Vol. 4(1), Jan. 2011
8. **Hermann BW:** On the reaction of the dental pulp to vital amputation and calxyl capping. *Dtsch Zahnarztl Z* 7:1446, 1952.
9. **Cohen H;** Regenerative Endodontics; *Pathways of the Pulp* 10th edition; Pg 602-20.