

Distribution Information

AAE members may reprint this position statement for distribution to patients or referring dentists.

About This Document

The following statement was prepared by the AAE Special Committee on the Scope of Endodontics to address issues being raised by some endodontic patients.

©2013

The guidance in this statement is not intended to substitute for a clinician's independent judgment in light of the conditions and needs of a specific patient.

Scope of Endodontics: Regenerative Endodontics

AAE Position Statement

Regenerative endodontics (revascularization/pulpal regeneration) is within the scope of practice of endodontics. According to the ADA Definition of the Specialty of Endodontics, *"its study and practice encompass the basic clinical sciences including biology of the normal pulp; the etiology, diagnosis, prevention and treatment of diseases and injuries of the pulp, and associated periradicular conditions."*

Regenerative endodontics is one of the most exciting new developments in endodontics. The current (2012) American Association of Endodontists' *Glossary of Endodontic Terms* defines regenerative endodontics as "biologically-based procedures designed to physiologically replace damaged tooth structures, including dentin and root structures, as well as cells of the pulp-dentin complex."

Pulpal necrosis in an immature tooth with an open apex can have devastating consequences for patients and presents a distinctive challenge for the endodontist. Prior to 2004, clinicians relied on traditional apexification procedures or the use of apical barriers to treat immature teeth with pulpal necrosis.

In 2004, Banchs and Trope published a case report describing a new treatment procedure for the management of the open apex called "revascularization." The protocol differs from traditional apexification techniques in that disinfection of the canal is done with both sodium hypochlorite and chlorhexidine and as described a combination of three antibiotics (ciprofloxacin, metronidazole and minocycline). At a subsequent appointment, the paste is removed and bleeding is induced into the canal. The canal is sealed with mineral trioxide aggregate, and after the MTA has set, a bonded restoration is placed. Unlike traditional apexification or the use of apical barriers, revascularization procedures allow for increase in both the length of the root and root wall thickness.

Endodontists are at the forefront of addressing the developments that must be made in tissue engineering in order to further pulp regeneration in the future. Hargreaves et al. recommended three major components of pulp regeneration which require further research for the development of pulpal regeneration: a) a reliable cell source capable of differentiating into odontoblasts; b) an appropriate scaffold to promote cell growth and differentiation, and c) signaling molecules, both growth factors and other compounds, that are capable of stimulating cellular proliferation and directing cellular differentiation. Research into these areas of regenerative endodontics is being conducted internationally at numerous institutions and articles have been published in multiple endodontic journals.

The 2011-2012 ADA Current Dental Terminology included a new code (D3354) for pulpal regeneration within the endodontic section of the code, recognizing that it is an endodontic procedure. According to a 2010 AAE survey of endodontic program directors, nearly three-fourths were teaching regenerative endodontics, both in didactic and clinical settings. CODA has approved a revision to the Accreditation Standards for Advanced Specialty Education Programs in Endodontics that would include a standard requiring programs to provide in-depth instruction and clinical training in revascularization/regenerative endodontics beginning in 2014.

References

1. Glossary of Endodontic Terms, 8th edition [Internet]. Chicago: American Association of Endodontists, 2012. Available from: <http://www.nxtbook.com/nxtbooks/aae/endodonticglossary/index.php>
2. Frank AL. Therapy for the divergent pulpless tooth by continued apical formation. J Am Dent Assoc 1966; 72:87-93.
3. Ghose LJ, Baghdady VS, Hikmat BYM. Apexification of immature apices of pulpless permanent anterior teeth with calcium hydroxide. J Endod 1987; 13:285-90.
4. Weisenseel JA, Jr, Hicks ML, Pelleu GB, Jr. Calcium hydroxide as an apical barrier. J Endod 1987;13:1-5.
5. Witherspoon DE, Small JC, Regan JD, Nunn M. Retrospective analysis of open apex teeth obturated with mineral trioxide aggregate. J Endod 2008;34:1171-6.
6. Banchs F, Trope M. Revascularization of immature permanent teeth with apical periodontitis: new treatment protocol? J Endod 2004 ;196-2004.
7. Hoshino E, Kurihara-Ando N, Sato I, Uematsu H, Sato M, Kota K, Iwaku M. In-vitro antibacterial susceptibility of bacteria taken from infected root dentine to a mixture of ciprofloxacin, metronidazole d minocycline. Int Endod J 1996;29:125-130.
8. Hargreaves KM, Geisler T, Henry M, Wang Y. Regeneration potential of the young permanent tooth: what does the future hold? J Endod 2008;34:S51-S56.
9. Jung I-Y, Lee SJ, Hargreaves KM. Biologically based treatment of immature permanent teeth with pulpal necrosis: a case series. J Endod 2008;34:876-887.
10. Friedlander LT, Cullinan MP, Love RM. Dental stem cells and their potential role in apexogenesis and apexification. Int Endod J 2009;42:955-62.
11. Huang A H-C, Chen Y-K, Chan A W-S, Shieh T-Y, Lin L-M. Isolation and characterization of human dental pulp stem/stromal cells from nonextracted crown-fractured teeth requiring root canal therapy. J Endod 2009;35:673-81.
12. Wang Z, Pan J, Wright JT, Bencharit S, Zang S, Evert ET, Teixeira FB, Preisser JS. Putative stem cells in human dental pulp with irreversible pulpitis: an exploratory study. J Endod 2010;26:820-5.
13. Alsanea R, Ravindran S, Fayad M, Johnson B, Wenckus C, Hao J, George, A. Biomimetic approach to perforation repair using dental pulp stem cells and dentin matrix protein 1. J Endod 2011; 37:1092-7.
14. Yamauchi N, Yamauchi S, Nagaoka H, Dugan D, Zhong S, Lee SM, Teixeira FB, Yamauchi M. Tissue engineering strategies for immature teeth with apical periodontitis. J Endod 2011;37:390-7.