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About This Document

The following statement was prepared in 2013 by the AAE Special Committee on the Scope of Endodontics to address issues being raised by some endodontic patients. It was reviewed and revised by the Regenerative Endodontics Committee in 2018.

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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 (2016) 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, associated to trauma, caries or dental anomalies, in an immature tooth with an open apex can have devastating consequences for patients and presents a distinctive challenge for the endodontists. 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 regenerative endodontic procedures (REP) recommended by the AAE differ from traditional apexification techniques in that the disinfection of the canal is done with minimal instrumentation and copious irrigation. A combination of three antibiotics (ciprofloxacin, metronidazole and minocycline) or calcium hydroxide are used as intra-canal medication between appointments. At a subsequent appointment, the paste is removed and bleeding is induced into the canal. The canal is sealed with a bioceramic cement, such as: MTA or Biodentine followed by a bonded restoration to seal the access.

Unlike traditional apexification or the use of apical barriers, regenerative endodontic procedures bring outcomes not seen before such as promotion of apical closure, root lengthening and root thickening. Additionally, some cases have shown positive responses to cold and/or electrical pulp tests during follow-up visits. These outcomes improve the prognosis for these immature teeth and should be considered as a first treatment option. Today most of the evidence-based practice for regenerative endodontics is based on case reports. Few clinical trials and cohort studies have been published. A recent systematic review and meta-analysis conducted by Torabinejad et al., confirms a high success and survival for the REP when they are compared with MTA-plug apexification.

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, fibroblast, nerves and blood vessels, 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 nationally and internationally at numerous institutions and articles have been published in multiple endodontic journals. Due to the increasing number of publications and the interest in this field, Dr. K. M. Hargreaves, the editor of the JOE, since 2016 had also contributed to rapid evolution in the field adding regenerative endodontics as a separate section in the table of contents of the journal.

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 program to provide in-depth instruction and clinical training in revascularization/regenerative endodontics beginning in 2014. Currently regenerative endodontics is not only within the scope of endodontics, endodontists are and must continue to be the leaders in this area.

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