



Regenerative endodontics is one of the most exciting new developments in the field of endodontics. The current (2012) American Association of Endodontists' (AAE) Glossary of Endodontic Terms defines regenerative endodontic procedure (REP) 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." Our present day knowledge through years & years of research on pulp biology & development, dental trauma & tissue engineering has led to this exciting new technique of regeneration of a functional pulp-dentin complex in a necrotic, immature tooth to restore them to a healthy state & creating an environment to allow continued root formation.

This newsletter outlines briefly the simple clinical tips, protocols & follows up on this procedure & discusses a recent case with an ongoing follow up that is being performed in our office. However, with ongoing research & development in the field of tissue engineering techniques, it won't be surprising if the present technique & protocol mentioned in this newsletter is obsolete in a year from now.

I hope you enjoy reading this edition of GreenRoot News.

-Ramya

Interesting Facts:

- This is an alternative treatment approach in immature necrotic teeth compared to traditional Calcium Hydroxide or more recent MTA Apexification.
- The main advantage of pulpal regeneration lie in the possibility of further root development and reinforcement of dentinal walls by deposition of hard tissue, thus strengthening the root against fracture.
- Stem cells in the pulp are responsible for the continued root formation & maturation in immature teeth. Even when the pulp becomes necrotic & infected, studies have shown that there are vital stem cells in the apical papilla which can be utilized to facilitate completion of root formation. This is done by disinfecting the canal space first followed by creating a scaffold for the stem cells in the periapical area to penetrate the pulp canal space.

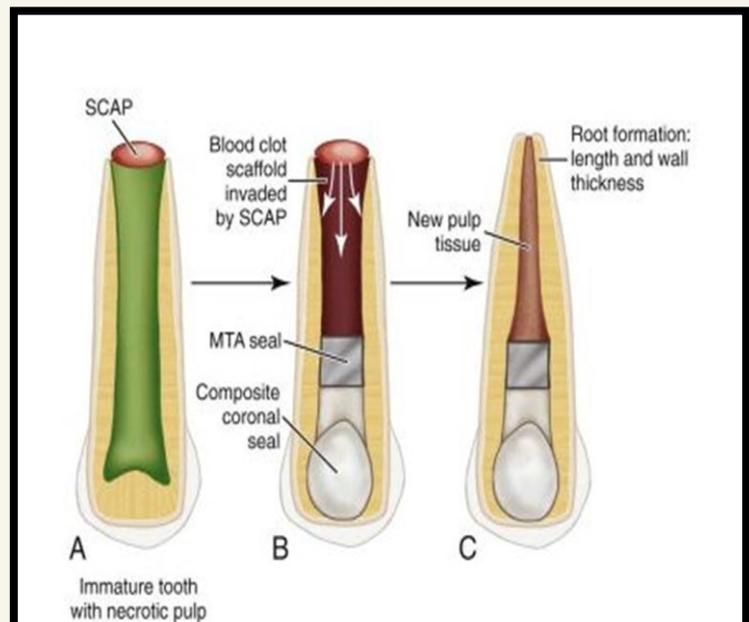
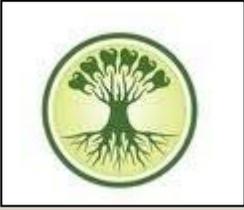


Fig. 1: Schematic representation of pulp regeneration.

A: Immature, nonvital tooth, showing location of Stem Cells of Apical Papilla (SCAP)

B: Following canal disinfection, bleeding is induced in the canal space to create a scaffold for invasion of Stem cells. A double coronal seal is then placed to prevent any coronal leakage.

C: Continued root formation & maturation following induction of stem cells in the disinfected canal space.



Case Report:

A 10 year old girl presented to our office with an extra oral abscess due to necrotic tooth #20 with a wide open apex. #20 had a leaky DO composite close to the pulp. Treatment options for immature necrotic teeth were discussed in detail including risks, benefits & alternatives of each option with the parent. Parent opted for regenerative endodontic therapy. Medical history was noncontributory with no known drug allergies to any of the antibiotics used in the Triple Antibiotic Paste (TAP).

During the Emergency visit, purulent drainage was obtained from the tooth as well as buccal gingival abscess. Patient was placed on systemic antibiotics & analgesics. No antibiotic paste was placed during this visit due to continuous purulent drainage from the canal space. A closed dressing was given at the end of the visit. Second visit was scheduled after a week. During the second visit, minimal instrumentation was performed followed by a copious irrigation with 5.25% Sodium Hypochlorite & 17% EDTA. Triple antibiotic paste was then injected into the canal space to aid in disinfection of the canal space. Third visit was scheduled after a month. Patient was completely asymptomatic by then.



Fig 2: Extra oral Abscess

During this visit, bleeding was induced into the canal space by over instrumenting the canal using H-file. A double barrier of MTA & Fuji ix was placed over the blood clot followed by Amalgam build up. Patient was placed on a yearly recall for the next few years.

One year recall radiograph confirmed the continued root formation in both length and width. Patient has remained symptom free following the procedure.



Fig 3: Pre-Op image showing wide open apex & leaky composite restoration

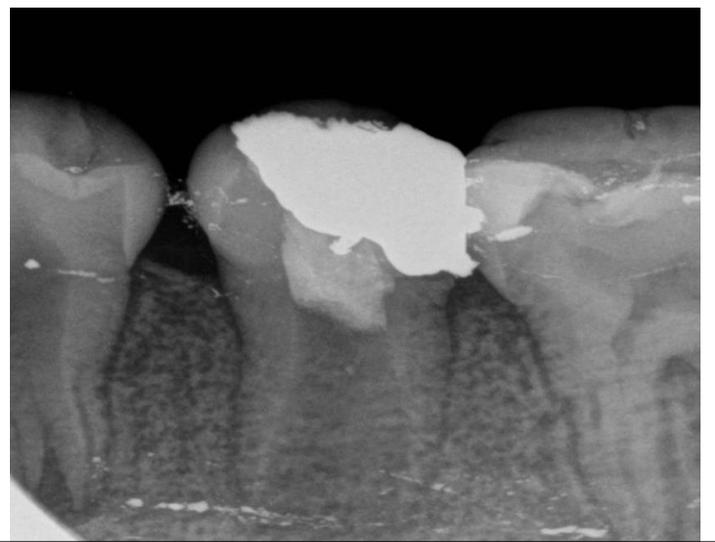


Fig 5: Immediate Post Op x-ray

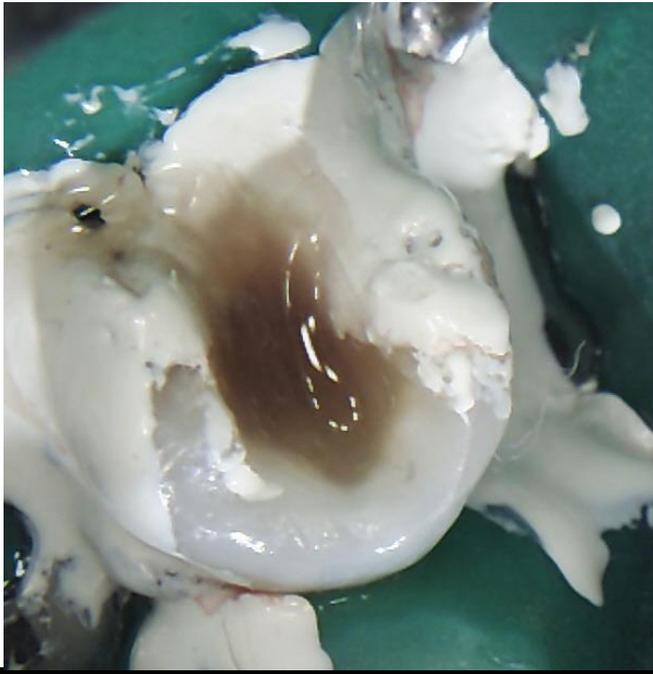


Fig. 6: Pus drainage established from the canal during first visit.



Fig. 7: Bleeding was induced to create a scaffold for influx of stem cells into the canal space.

Pre-Op



1 year recall



Fig. 8: 1 year recall showing continued root formation.



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