LANGLEY ENDODONTICS

DR. HOWARD BITTNER INC.

Certified Specialist in Endodontics

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APEXIFICATION WITH MTA

When teeth with immature roots suffer pulpal necrosis, the formation of dentin stops and root development ceases. As a result the canals remain wide with thin dentin walls and a large apical opening. Often the root canal system has an inverse architecture with the apical diameter significantly wider than the coronal diameter.

This blunderbuss shape creates a challenge to achieving effective cleaning and shaping of the canal. All our instruments have an apical-coronal taper of .02 or greater so cleaning of the walls is difficult. Only a randomized envelope of motion with a pre-curved reamer - as described by Schilder – and copious irrigation with NaOCL will create enough wall contact to remove bacteria and debris.

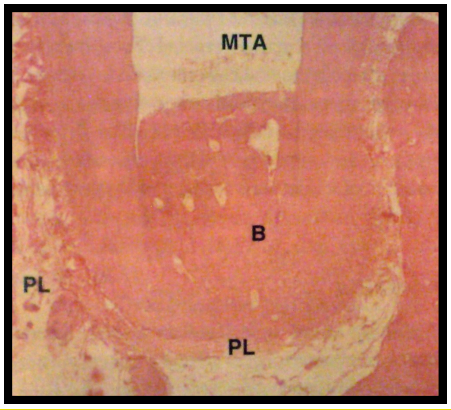
Necrotic immature teeth also present challenges to obtaining a secure apical stop. Without a good stop the apical termination of the gutta percha is unpredictable often resulting in poorly condensed or overfilled canal. Only a warm GP protocol such as vertical compaction of warm gutta percha (the Schilder technique) or the "squirting" of preheated GP from an Obtura gun can achieve a solidly compacted apical fill and apical seal. These warm techniques depend on having a conical shaped root canal preparation where the apical diameter is the smallest and canal diameters increase coronally to prevent overfills.

Over the years calcium hydroxide (CaOH) pastes have become the material of choice to create an artificial apical barrier. CaOH promotes closure of the apex with calcified tissue at the apical interface (apexification). Despite its efficacy, CaOH has several deficiencies such as long treatment times - up to one year or more, delayed restoration of traumatically damaged teeth in the esthetic zone, multiple appointments, and the resultant treatment costs.

Felippe *et al*, in the January 2006 issue of IEJ, looked at the ability of mineral trioxide aggregate (MTA) to induce apical closure and periapical healing. MTA has been used for over 15 years as a root end filling in apical surgery cases with excellent results. MTA, with sterile water, compacts like wet sand in the root canal, hardening within 4 hours. Thirteen immature Beagle dog teeth were cleaned, shaped, and the apical third densely packed with MTA. The teeth were blocked sectioned after 5 months and evaluated histologically.

The authors found that MTA resulted in significantly higher numbers of teeth with a complete boney barrier at the level of the apical foramen when compared with CaOH. Further, this was achieved with a one appointment technique.

The only challenge in my experience to using MTA as an apical barrier material is predictably controlling the apical placement and density of the MTA. Packing a resorbable barrier, such as Collacote into the boney crypt to the level of the foramen under high magnification will create a backstop for the MTA placement. Ultrasonic vibration of the MTA will ensure a dense, gapless fill in the apical third of the canal which can be back packed with warm GP.



MTA barrier picture caption.

B–bone, PL–periodontal ligament

In the next newsletter I will talk about Healing Outcomes after Obturation with Resilon or Gutta Percha

Langley Endodontics, Dr. Howard Bittner

#303, 6351-197th St., Langley, B.C. V2Y 1X8 PH: 604-532-4090