A contemporary endodontic approach using bioceramic cement

By Prof. Dr. Leandro A. P. Pereira

Endodontics is the specialty of den- tistry which prevents or treats pathologies of pulpal and peripulpal origin. The ultimate goal is to cure the endodontic disease and allow the affected tooth to reestablish its aesthetic/functional functions through a complementary restorative treat- ment.

Obturation of the root canal system is an important step in endodontic treatment and its function is to fill and seal the canals to prevent their recontamination. With the evolution in intracanal microbiological knowl- edge and the impact of new canal modeling instruments with continu- ous or alternating rotation, we know that it is not possible to completely eliminate the microorganisms in- side the endodontic microanatomy. However, we also know that this is not necessary for success, and that the significant reduction in the lev- els of intracanal infection, in most cases, is sufficient to achieve success (Siqueira). Thus, at the time of ob- turation, it is necessary to create an intracanal environment which is unfavourable to the population growth of the remaining bacteria. Therefore, another function of obturation is to prevent or hinder the growth of residual bacteria not eliminated dur- ing the cleaning and disinfection process.

To achieve the desired objectives, obturation cements must have es- sential properties in order to be used clinically. These are: capacity to fill, seal, and present dimensional stabil- ity; not being soluble in the organ- ics, having a film thickness or no more than 50 micrometers; being radiopaque; having good drainage; not producing chromatic alter- ations; having suitable working time; to set and be easy to manipu- late and easy to remove if necessary; to promote cementogenesis; to be biocompatible and non-irritating to the tissues of the periapex (Kenneth M. Hagrange 2009).

However, with the development of new materials and rehabilita- tion concepts in the era of adhesive dentistry, the search for two other characteristics has become increas- ingly important in the development of new endodontic cements. One of them is the absence of excess, which interferes in the strength of the bond of the resin systems (Vanó et al. 2006). The other characteristic is bioactivity. Bioactivity is the ca- pacity of a material to be integrated with the tissues and structures of the organism with which it is in contact. Bioactivity of the MTA is known as biomimetic and was first described by Reyes and Carmona in 2009. In one in vitro study, the authors used scanning electron mi- croscopy images to observe the in- tegration of the MTA with the dentin through deposition of numerous ap- atite groups on the dental collagen fi- bers throughout the dentinal tubule surface in contact with the MTA. An- other very interesting factor is that the authors observed that the more contact time the material had with the dentin, the more extensive the mineralizations were. These mineral- izations took place, integrating the material with the dentin, and may be responsible for the superior adapta- tion of this material to the dentin (Reyes-Carmona 1995).

However, the low drainage capac- ity of MTA does not allow for its use as an obturating cement. Thus, to get the benefit of this material’s biocompatibility, a new class of ob- turating endodontic cement was created, known as silicate-based ce- ments. This designation is derived from the components which make up the MTA and which are present in these cements. They are: Tricalcium silicate, Dicalcium silicate, Calcium Oxide and Tricalcium aluminate.

The clinical case below shows the

**MTA-Fillapex**

Bioceramic root canal sealer

FEATURES AND BENEFITS

- **Biocompatible**: fast tissue recovery without causing inflammatory reactions
- **High radiopacity**: 77% greater than 3mm aluminium scale
- **Excellent flow**: Allows filling of accessory canals

**Bio-C Sealer**

Bioceramic root canal sealer

- **Ready to use**
- **Non-resinous**
- **Antibacterial action**

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Advisor in Bioceramics and Professor of Endodontics at Universidade Federal de Minas Gerais, Brazil. He is an expert in Endodontics, involved in teaching, research and consultation in the area. He is a founder of Angelus®, an international company that produces bioceramic products for dentistry.

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After the modeling of the canals, the system of canals was dried and filled with EDTA 17% and an intracanal ultrasound tip (Helix) was used to passively activate the substance for 3 cycles of 15 seconds with renewal of the substance for each cycle. After the ultrasound passive activation, the canals were again irrigated with 5 ml of Sodium Hypochlorite at 2.5%. The main gutta percha cones were tested and adjusted. After this, the system of canals was dried with aspiration micro-evacuacanal connected to a vacuum suction.

The Fillapex MTA cement (Angelus) was prepared and introduced into the canals using the main gutta percha cones. The excess from the cones was cut using a heat transfer system (Touch’n Heat Sybron Endo) and cold compressed vertically. The pulp chamber was sealed with photopolymerizable composite resin and the patient was sent to her dentist for definitive restoration of the dental element to be performed. After 17 months, the patient came in for a control consultation, and on the X-ray, it was possible to observe endodontic success characterized by the absence of signs and symptoms, the tooth functioning physiologically, normality of the periapex, and reabsorption of the surplus Fillapex MTA.

References
8. AAE Consensus Conference on Diagnostic Terminology: background and perspectives.