



A contemporary endodontic approach using bioceramic cement

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Endodontics is the specialty of dentistry which prevents or treats pathologies of pulpal and periapical origins. The ultimate goal is to cure the endodontic disease and allow the affected tooth to reestablish its aesthetic/functional functions through a complementary restorative treatment.

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 knowledge and the impact of new canal modeling instruments with continuous or alternating rotation, we know that it is not possible to completely eliminate the microorganisms inside the endodontic microanatomy. However, we also know that this is not necessary for success, and that the significant reduction in the levels of intracanal infection, in most cases, is sufficient to achieve success (SIQUEIRA). Thus, at the time of obturation, it is necessary to create an intercanal environment which is unfavorable 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 during the cleaning and disinfection process.

To achieve the desired objectives, obturation cements must have essential properties in order to be used clinically. These are: capacity to fill, seal, and present dimensional stability; not being soluble in the organic tissue fluids; having a film thickness or no more than 50 micrometers; being radiopaque; having good drainage; not producing chromatic alterations; having suitable working time; to set and be easy to

manipulate and easy to remove if necessary; to promote cementogenesis; to be biocompatible and non-irritating to the tissues of the periapex (Kenneth M. Hargreaves 2001).

However, with the development of new materials and rehabilitative concepts in the era of adhesive dentistry, the search for two other characteristics has become increasingly important in the development of new endodontic cements. One of them is the absence of eugenol, which interferes in the strength of the bond of the resin systems (VANO et al 2006). The other characteristic is bioactivity. Bioactivity is the capacity 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 biomineralization and was first described by Reyes and Carmona in 2009. In one in vitro study, the authors used scanning electron microscopy images to observe the integration of the MTA with the dentin through deposition of numerous apatite groups on the dental collagen fibrils throughout the dentinal tubule surface in contact with the MTA. Another 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 mineralizations took place, integrating the material with the dentin, and may be responsible for the superior adaptation of this material to the dentin (Torabinejad 1995 Reyes-Carmona 2009).

However, the low drainage capacity 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 obturating endodontic cement was created, known as silicate-based cements. 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 use of the Fillapex MTA cement (Angelus) associated with gutta percha cones for endodontic obturation of a case of endodontic treatment performed in a single session.

A 56-year-old female Caucasian patient came to the office complaining of spontaneous, pulsing pain which did not cease with the use of analgesics and anti-inflammatories in the left mandible region. She had a negative response to the test of apical palpation and vertical and lateral percussion on all the teeth of this quadrant. Thermal tests showed an exacerbated, long-duration positive response both the long-term to both cold and heat on tooth 37. On the other teeth of the quadrant, a slight, short-duration positive response shown to cold, with a negative response to heat.

According to the classification of the American Endodontics Association, tooth 36 had a pulpal and periapical diagnosis of irreversible inflammatory pulpitis with normal periapex. The treatment indicated was endodontic treatment.

The treatment was conducted in its entirety with the use of an Operative Microscope, varying the magnification between 2.5 and 12.5X. Access the the pulp chamber was done with a 1013 spherical diamond bit followed by a 3082 conical-truck diamond bit and the finishing was done with a conical-truck diamond ultrasonic tip (E7D Helse). After location of the canals, a type-K #10 file was slowly introduced until reaching 2/3 of the initial X-ray length of the tooth. This was followed by a reciprocating instrument #25.06 (Reciproc -VDW) with apical progression in sequences of 3 movements around 1 mm in amplitude in the apical direction. With each sequence of 3 movements with the reciprocating instrument, irrigation was done with 5 ml of sodium hypochlorite at 2.5% and a type-K #10 file was take to 2/3 of the X-ray length of the tooth. This procedure was repeated until the Reciproc 25 instruments would reach this pre-established length.

The next step was to conduct electronic odontometry with a foramen locator and to establish the real work length. On the work length, the diameter of the region was verified through introduction of different calibers of manual type-K files until one of them is observed to adapt to the lateral walls of the canals. In the mesial canals, the instrument which adapted to this region was the #30, and in the distal canal, #40. In this way, and in the same initial operative sequence or

preparation, modeling, and irrigation, the mesial canals were prepared for the Reciproc 40 (VDW) instrument, and the distal was prepared for the Reciproc 50 (VDW) instrument.

After the modeling of the canals, the system of canals was dried and filled with EDTA-T 17% and an Irrisonic ultrasound tip (Helse) 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 5ml 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-cannulas connected to a vacuum suctor.

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.

Bibliographical References

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Fotos

Figure 01.
Initial X-ray



Figure 02.
Initial clinical condition



Figure 03.
Clinical aspect after removal of the provisional restoration

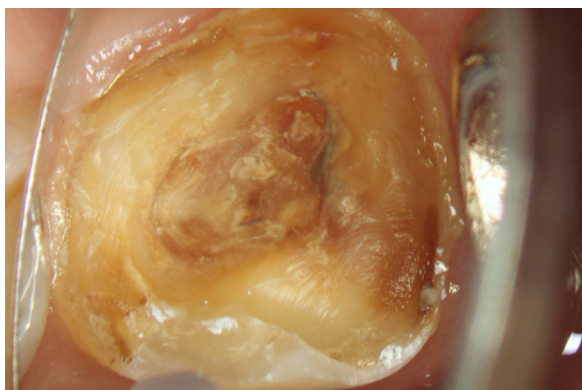


Figure 04.
Access to the pulp chamber and location of the canals

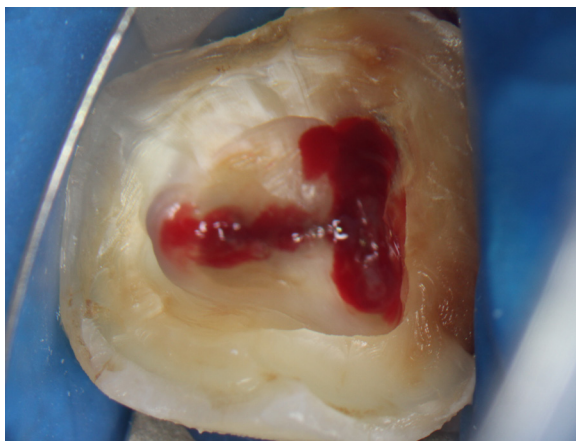


Figure 05.
Modelos and disinfected canals



Figure 06.
Canals obturated with Gutta Percha and Fillapex MTA



Figure 07.
Final X-ray



Figure 08.
Control X-ray after 17 months

