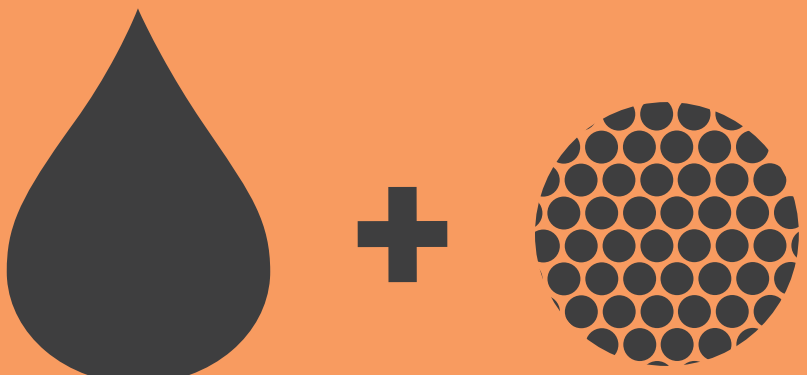
MTA Line

MTA Repair HP
MTA Angelus®
MTA Applicator
MTA-Fillapex



angelus®

MTA Repair HP

Bioceramic high-plasticity reparative cement

- **New formula:** a much easier manipulation and insertion into the dental cavity after hydration
- **New radiopaquer Calcium Tungstate ($CaWO_4$):** prevent staining of the root or crown
- **Initial setting time of 15 minutes:** allowing the completion of treatment in a single session
- **Low solubility:** more prolonged action and quicker tissue healing
- **Setting expansion:** high marginal sealing capability which prevents the migration of microorganisms and fluids into the root canal
- **Regeneration stimuli:** excellent biological sealing of root perforation (canal and furcation) inducing the formation of periradicular cement
- **Pulp regeneration:** induces the formation of a dentin barrier when used on pulp exposures
- **Hydrophilic:** enable its use in humid conditions without changing its properties

PRESENTATION

8469	10 capsules of powder with 0.085 grams each and 10 vials of liquid

BIOCERAMIC HIGH-PLASTICITY REPARATIVE CEMENT

MTA has its use established in Endodontics due to the clinical results proven through numerous scientific studies. However, due to the physical properties inherent to the product's powder, the "sandy" consistency hinders manipulation and transport of the material to the site of repair.

To improve these characteristics, ANGELUS® has developed a new formulation called MTA REPAIR HP - "High Plasticity" MTA.

This new formula maintains all the chemical and biological properties of the original MTA, which guarantees the success of the treatment, but changes its physical properties of manipulation. The result is a product with greater plasticity, facilitating its handling and insertion in the dental cavity.

MTA REPAIR HP is an endodontic bioceramic high-plasticity restorative cement, composed of mineral oxides in the form of fine hydrophilic particles.

Indications

1. Treatment of iatrogenic or decay-related perforation (root and furcation)
2. Treatment of root perforation associated with internal resorption
3. Surgical treatment of root perforation
4. Parendodontic surgery with retrofilling (Apicoectomy)
5. Direct pulp capping
6. Pulpotomy
7. Apexigenesis
8. Apexification

Spec Sheet

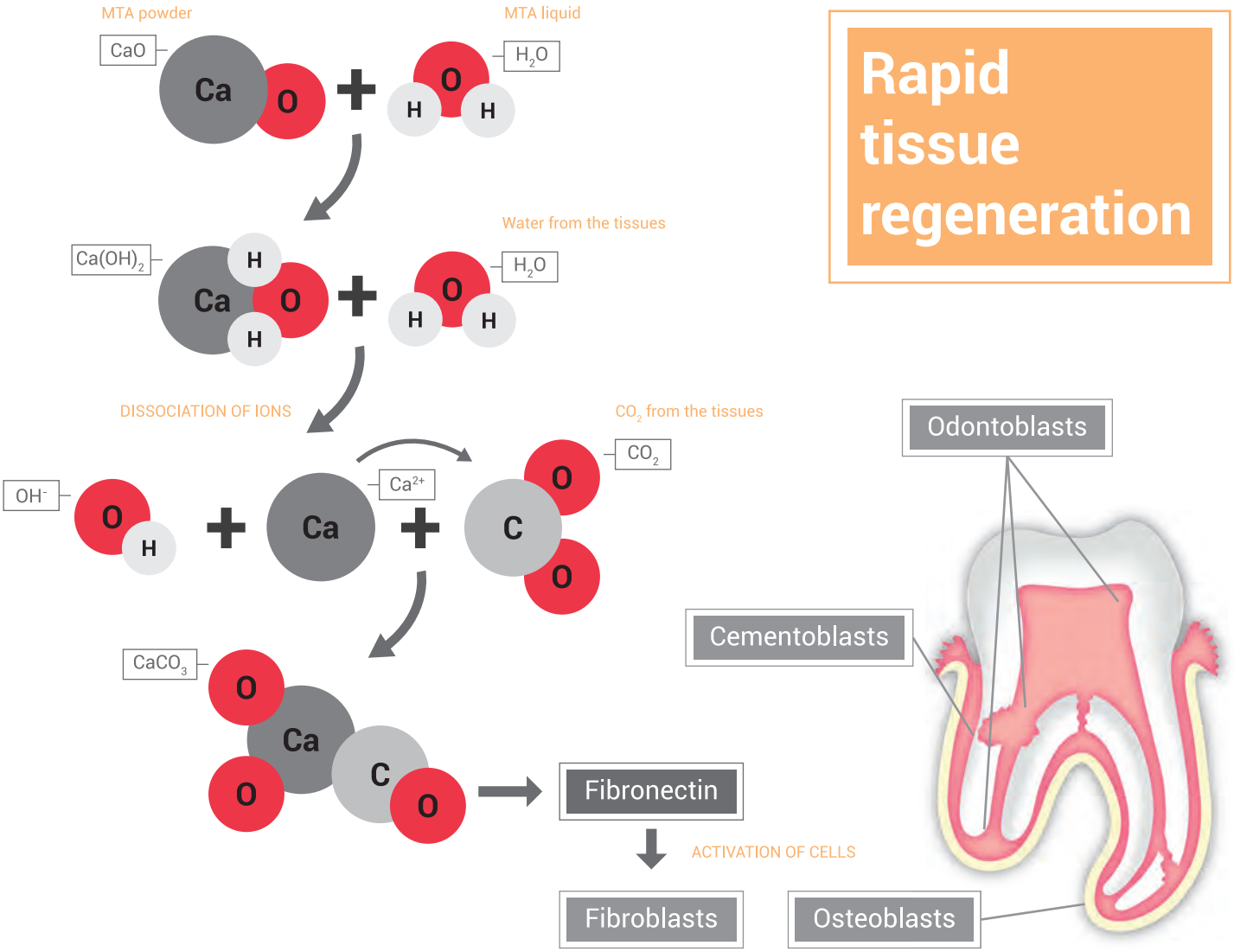
Proportion	0.085 g powder / 0.25 ml liquid
Color	White
Setting time	15 minutes
Radiopacity	Greater than 3 mm Al (higher than dentin)
Solubility	0.005%
Storage	Dry environment
Shelf-life	3 years

Active mechanism of MTA Repair HP

MTA is a bioactive material that induces the healing of periapical lesions, stimulates the formation of cementum, bone and, indirectly, periodontal ligament.
It is the first material known in Endodontics which allows the growth of cementum layer directly from its surface. The size and distribution of its particles, the powder/liquid ratio and some external agents such as temperature and humidity are responsible for the properties and effectiveness of the material.
MTA Repair HP has a high concentration of free Calcium Oxide in its composition. This oxide reacts with water, forming Calcium Hydroxide. Calcium Hydroxide is currently the most used intracanal medication and, its effectiveness, has been proven by extensive scientific research. When in contact with fluids from the surrounding tissue, Calcium Hydroxide is dissociated into Calcium ions (Ca^{2+}) and Hydroxyl ions (OH^-), and it is precisely the effect of these ions on the tissues and microorganisms that is responsible for the product's outstanding results.
With the accumulation of Hydroxyl ions, the pH of the site becomes highly alkaline and, therefore, inhospitable to bacterial proliferation. This high pH will damage the membrane and the DNA of the bacterium, denaturing its protein content.
The elevation of the pH also activates the Alkaline Phosphatase, an enzyme that stimulates the release of inorganic Phosphates from phosphate esters. Free inorganic Phosphate ions react with the Calcium ions forming Calcium Phosphate, the main component of hydroxyapatite.
Several authors show that Calcium Hydroxide, once inside the canal, may influence areas of resorption, preventing osteoclastic activity and stimulating the repair process.
Calcium ions are important in the activation of Calcium-dependent Adenosine Triphosphate, migration and cellular differentiation, and they react with carbon dioxide from tissue to form Calcium Carbonate crystals, which serve as nuclei for calcification.
Calcium ions react with CO_2 present in the tissue and form granules of calcite ($CaCO_3$). Fibronectins cluster in the vicinity of these granules.
Then, with cellular differentiation and layers of cementum and bone, the periapical lesion is repaired.

Merely illustrative images.

ACTIVE MECHANISM OF MTA REPAIR HP



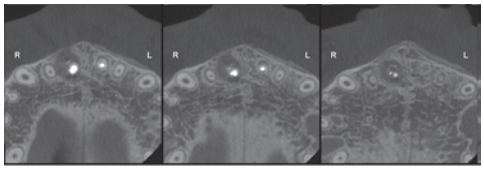
Rapid tissue regeneration

MTA REPAIR HP CLINICAL CASES

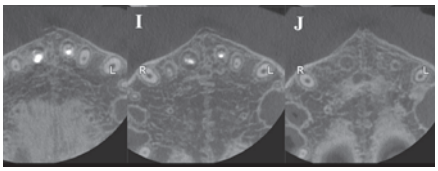
Clinical Case 01

Parendodontic surgery with retrofilling (Apicoectomy)

Initial x-ray



Initial axial tomography



Final axial tomography

Final x-ray

Radiographs gently provided by Prof. Drs. Mario Zuolo

Clinical Case 02

Parendodontic surgery with retrofilling (Apicoectomy)

Initial x-ray

4 months - post-op

Radiographs gently provided by Prof. Drs. Débora Sellera

Merely illustrative images.

12 YEARS WITH SCIENTIFIC PROVEN RESULTS

MTA Angelus®

Bioceramic Reparative Cement

- Ions Calcium Release
- Capable of inducing neoformation of periradicular cement
- Easy to use
- Bactericidal
- Low solubility: does not disintegrate
- Biocompatible to oral tissues
- Adequate compressive strength
- More radiopaque than dentin and bone

PRESENTATIONS

1822	MTA White (5 g), distilled water (3 ml), 1 scoop.
820	MTA Grey (1 g), distilled water (3 ml), 1 scoop.
821	MTA Grey (2 g), distilled water (3 ml), 1 scoop.
822	MTA White (1 g), distilled water (3 ml), 1 scoop.

Biological properties of MTA Angelus

A. ANTIMICROBIAL ACTIVITY

MTA has a high bactericidal effect on facultative anaerobic microorganisms. (TORABINEJAD et al., 1995)
A similar effect was also shown on Lactobacillus sp, Streptococcus mitis, Streptococcus mutans and Streptococcus salivarius. (HONG et al., 1993; DUARTE, M. A. H. et al. 2002).

B. MUTAGENICITY

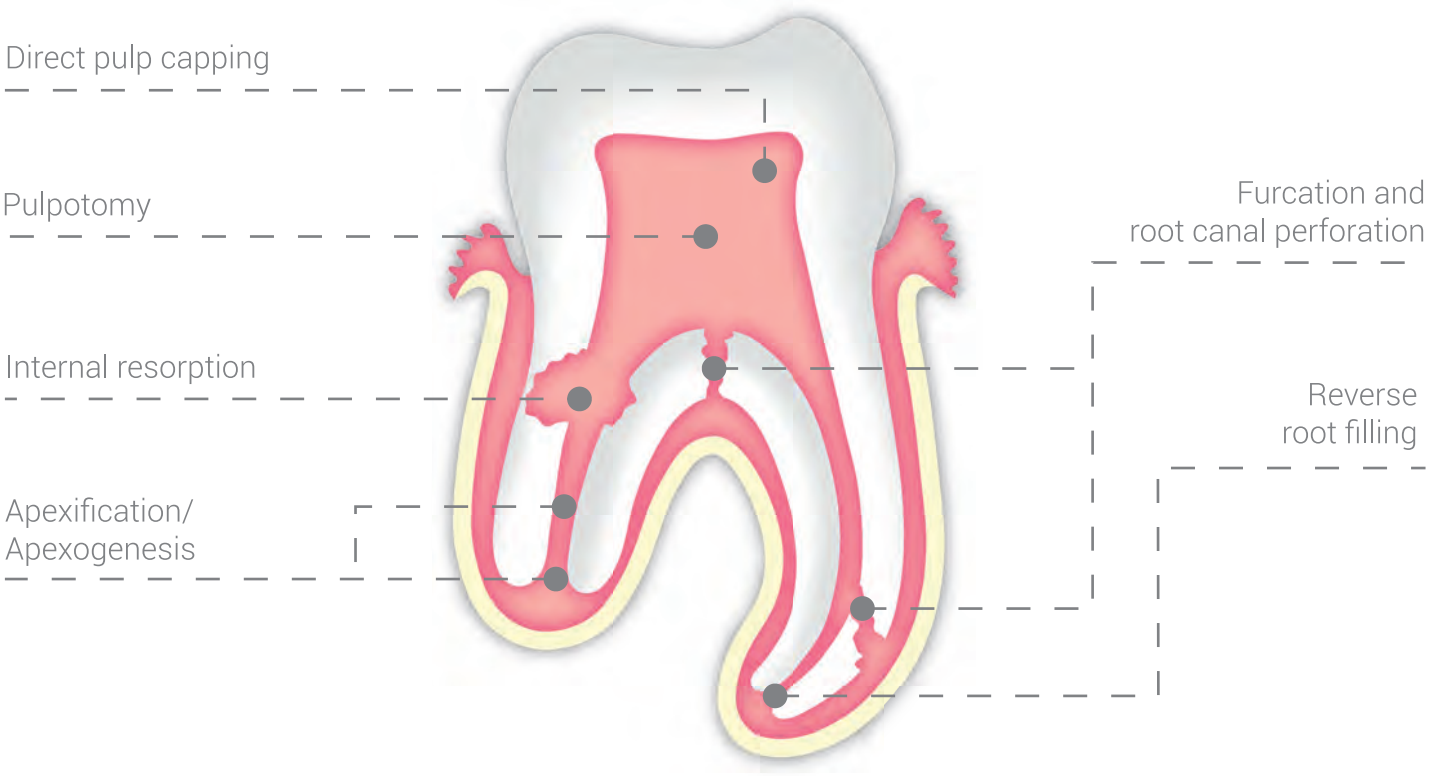
After extensive testing, the conclusions are that MTA does not demonstrate carcinogenic potential. (VILARINHO, R. H. et al. 2005).

C. TOXICITY

The cellular response elicited by Angelus® MTA, evaluated through cytomorphologic investigation of osteoblasts, classifies the cement as biocompatible.
All research studies on cytotoxicity and tissue reaction in the presence of MTA, demonstrate its high biocompatibility. (TORABINEJAD et al., 1995; FORD et al., 1996; FREDERICO, P. G. et al. 2006; DEUS, G. et al. 2003).

Merely illustrative images.

INDICATIONS



Technical Data

PHYSICAL PROPERTIES	
Initial Ph	10,2
Ph after 3 hours	12,5
Initial Compression Resistance	44,2 MPa
Compression Resistance after 21 days	67 MPa
Solubility	0,1 - 1%
Medium size of particles	3,907 5 m
Radiopacity	7,17mm/Al
Displacement Resistance	9,7 lb
Íons Ca release	10,10 ppm
Dimensional stability	0,12%
Surface Roughness (Ra)	1,90 5 m
Micro hardness	39,9 HVN
Setting time	15 min

Merely illustrative images.

Mechanism of Action

Reaction to Rat Connective Tissue to Implanted Dentin Tubes Filled with Angelus® MTA Holland et al., 2001.
Angelus® MTA was packed inside dentin tubes. These tubes were implanted in subcutaneous tissue of rats and left from 7 to 30 days. Samples were removed, fixed, included and sectioned (without decalcification).

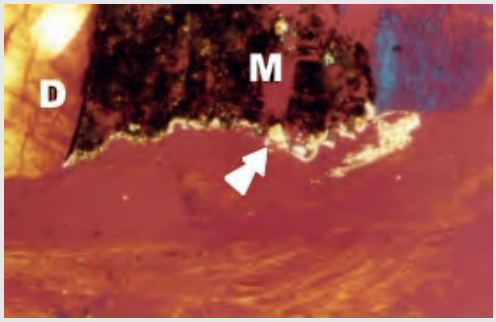


Figure 1. Notice Angelus® MTA (M) inside dentin tube (D). Adjacent to the material surface, there is calcite granulation (arrow). Polarized light. 80 X.

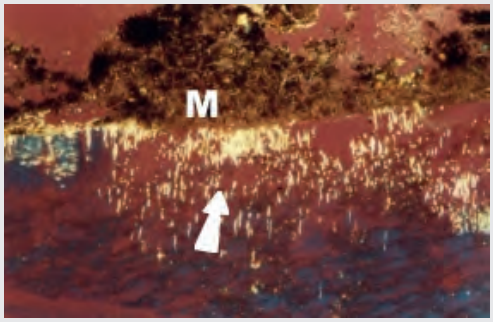


Figure 2. Calcite granules (arrow) inside dentinal tubules and Angelus® MTA (M) inside dentin tube. Polarized light. 80 X.

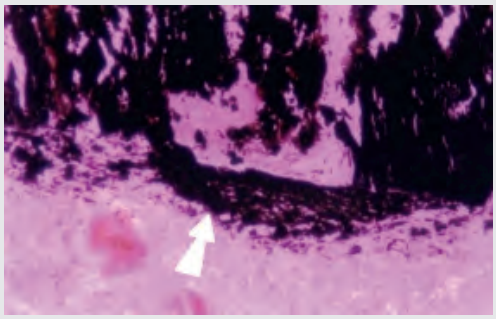


Figure 3. Notice a hard tissue bridge (Von Kossa positive) adjacent to the tube entrance (arrow) 100 X.

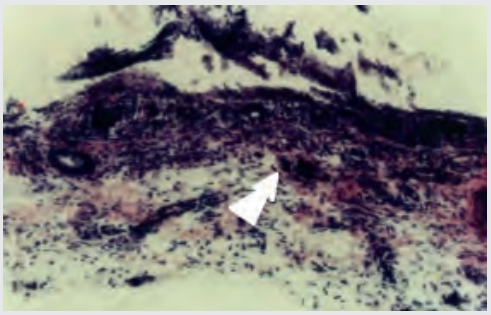


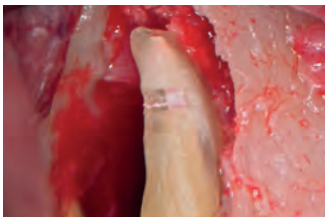
Figure 4. Basophilic sites (arrow) indicating calcification and connective tissue with few cells of the chronic inflammation type. HE. 100 X.

It was concluded that the results obtained were similar to those of previous studies with Pro Root® (Dentsply).

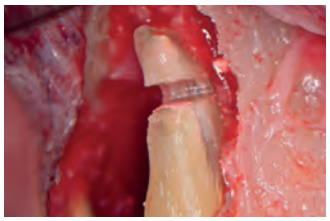
MTA ANGELUS® CLINICAL CASES

*Reverse root filling*****

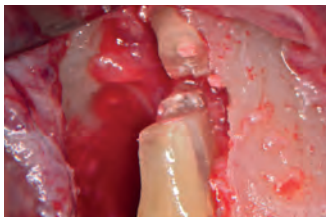
Initial X-ray



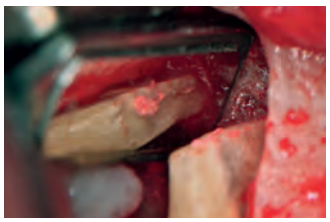
Groove for root sectioning



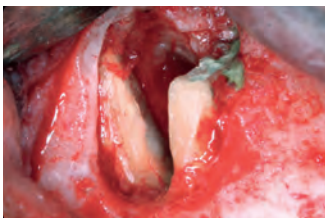
Root sectioning



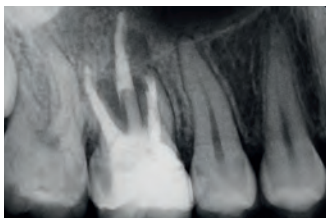
Root sectioned



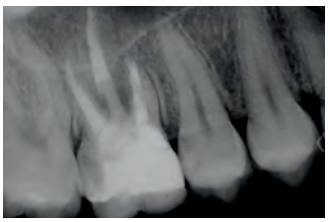
Mirror view of sectioned apex



Apex retrofilled with MTA



8 months post op



24 months post op

Radiographs gently provided by Profs. Drs.: *Clóvis M. Bramante, **Débora P. Serella, ***Danilo Shimabuko, ****Leandro Pereira

Merely illustrative images.

*Direct Pulp Capping***

Initial X-ray

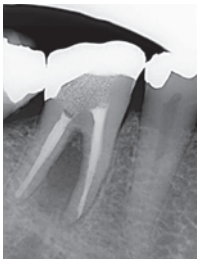
60 days post op

*Pulpotomy**

Initial X-ray

12 months post op

*Furcation and Root Canal Perforation***

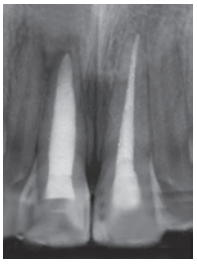


Initial X-ray: Root Canal Perforation

3 years post op

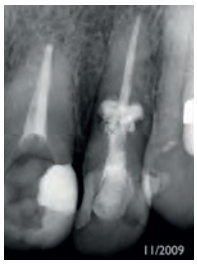
*Apexification/Apexogenesis****

Initial X-ray



18 months post op

*Internal Resorption*****



Initial case

Immediately post op

3 years post op

Learn more about MTA Angelus® and MTA Repair HP

The manufacturing process of Angelus MTA is a completely synthetic process. The raw material used for its manufacture comes from pure composites (P.A.), which are sintered in furnaces appropriate for the production of the clinker.
The Clinker is ground to obtain particles of an appropriate size for the complete hydration and maximum obtainment of its chemical, physical, and biological properties.

Merely illustrative images.

MTA Applicator

Instrument to apply MTA

- **Extremely thin tip:** allows use in clinical endodontic procedures (intracanal) and surgical.
- **Sterilizable:** guarantee of biosafety.
- **Ergonomic design:** easy handling.
- **Two sizes:** for use in various cavities.

SIZES	
Medium	1.2 mm diameter (embolus) and 1.85 mm diameter (external part)
Small	0.6 mm diameter (embolus) and 1.2 mm diameter (external part)

PRESENTATIONS

Presentations:
Ref. 155: 1 unit (medium).
Ref. 156: 1 unit (small).

155	1 unit (medium)
156	1 unit (small)

More information on our website

Merely illustrative images.

MTA-Fillapex

Bioceramic Root Canal Sealer

Flow rate of 27.66 mm allowing filling of accessory canals.

(SPIRONELLI RAMOS, C.A, DDS, MS, PhD)

- **Biocompatible:** tissue healing with little inflammation
- **High radiopacity**
- **Presence of Calcium ions:** helps bones and tissues regrow
- **Paste/paste presentation:** easy handling
- **Easy removal**

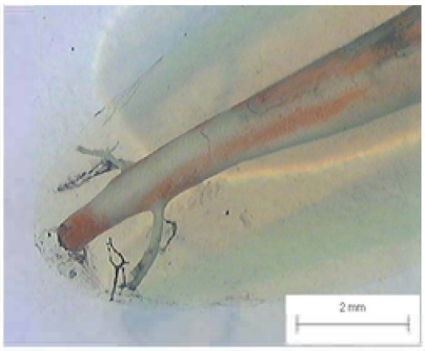
PRESENTATIONS

826	1 tube of base paste (18 g), 1 tube of catalyst paste (12 g) and 1 mixing pad
827	1 double barrel syringe (4 g), 15 automixing tips and 1 mixing pad
158	10 automixing tips

PHYSICAL, CHEMICAL AND BIOLOGICAL PROPERTIES

Sealing of root canals

MTA-Fillapex shows an optimized flow due to the nanoparticles. It provides excellent filling and sealing of the main and lateral canals, as shown below.



SANTIAGO, G.C. Comparative "in vitro" study of apical sealing techniques using lateral condensation and Tagger's hybrid cements with Pulp Canal Sealer™ and MTA-Fillapex - CIODONTO MG, 2011

Flow

MTA-FILLAPEX	SUGGESTED ISO 6876: 2001
27,66 mm (average diameter)	≥20 mm (average diameter)

Film Thicknessel Film

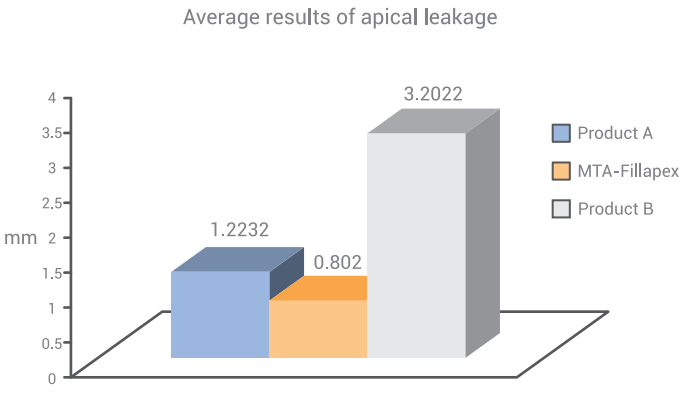
MTA-FILLAPEX	SUGGESTED ISO 6876: 2001
39,6 µm*	≤50 µm

* Proves its high filling capaci ty, even in secondary and accessory canals.

Merely illustrative images.

Setting Expansion

The setting expansion of the material decreases apical leakage, as demonstrated by the work below:



IN VITRO EVALUATION OF APICAL LEAKAGE OF ENDODONTICS CEMENTS: MTA-FILLAPEX, Product A and Product B. Moreira J.V, Gomes Filho, J.E., Watanabe,S, Rodrigues, G.B. - Campus de Araçatuba - Faculdade de Odontologia de Araçatuba - 2010.

Dimensional Change

ISO sets that the average dimensional change of the material should not exceed 1.0% shrinkage or 0.1% expansion.

MTA-FILLAPEX	SUGGESTED ISO 6876: 2001
0.088% expansion	0.1% expansion 1.0% shrinkage

Conclusion:
The material fulfilled the requirements standardized by ISO, with an average dimensional change = 0.088%* expansion.

*Center for the Development and Control of Biomaterials UFPel (Brazil)

Solubility

According to the ISO recommendations after the solubility test, the weight difference between the initial and final Petri plate weights (where the samples were stored), represents how much the material solubilized. This value should be around 0.1% and should not exceed 3%.

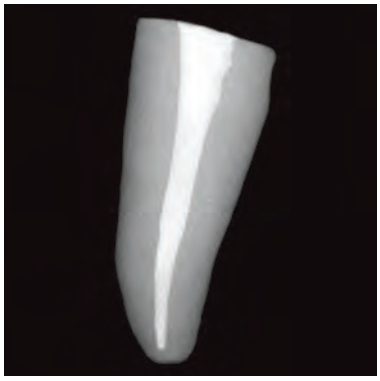
MTA-FILLAPEX	SUGGESTED ISO 6876: 2001
0.1%	≤3%

Conclusion:
The material showed a variation of 0.1%, after submission to the phenomenon of solubility, a value lower than the maximal variation accepted by ISO which is 3%.*

*Center for the Development and Control of Biomaterials UFPel (Brazil)

Radiopacity

The optical density of the sealer must be equal or superior to the area of the aluminum scale that corresponds to a thickness of 3 mm. Software Image J was used to calculate the optical density in pixels. MTA-Fillapex presented a value 146% superior to the 3 mm of the aluminum.



X-ray after the use of MTA-Fillapex in extracted roots

Radiographs gently provided by Grecca, F. S. and Scarparo, R. (UFRGS).

Working Time - 23 minutes

The obtained time is perfectly adequate to follow all steps of the endodontic filling technique, especially in cases of teeth with multiple root canals.

Setting Time

ISO does not show a specific time for materials that exceed 30 minutes in their setting times, so the only requirement is that this should be evaluated and reported by the manufacturer.
MTA-Fillapex showed average setting time of 130 minutes (2 hours and 10 minutes) with a variation of ±10 minutes.

Merely illustrative images.

Simplified!

angelus®