SCIENTIFIC PROFILE

MTA FILLAPEX

ENDODONTIC SEALER

angelus®
science and technology

SUMMARY

1. GENERAL INFORMATION....04

1.1. General considering about endodontic sealers....04

1.2. MTA Fillapex....05

2. COMPOSITION....06

3. PRESENTATION....06

4. INDICATIONS....07

5. PHYSICAL, CHEMICAL AND BIOLOGICAL PROPERTIES....08

5.1. Manipulation and insertion....08

5.2. Sealing of root canals....08

5.2.1. Flow....08

5.2.2. Film thickness....09

5.3. Dimensional change....10

5.4. Solubility....12

5.5. Antimicrobial action....13

5.6. Ease of removal....13

5.7. Radiopacity....14

5.8. Biocompatibility....15

5.9. Working and setting time....16

5.9.1. Working time....16

5.9.2. Setting time....17

5.9.3. Complexation reaction....18

6. CLINICAL EVALUATION....19

7. TECHNIQUE FOR USE....20

8. PUBLICATIONS....21

1. GENERAL INFORMATION

1.1. General considering about endodontic sealers

Since ancient times there is a concern of dental professionals in relation to root canal filling. The science of Endodontics has been continuously seeking to improve the knowledge and performance of endodontic sealers, as well as other materials and instruments used in this specialty field. The aim of filling a root canal is to keep the periapical tissues healthy. McElroy in 1955 had already described many substances that were used for filling root canals. With the evolution of research, new materials became available in the market for root canal filling.

According to GROSSMAN (1974), root canal filling materials must have the following properties:

A. It should be easily introduce inside the root canal.

B. It should seal the whole root canal system, including lateral and accessory canals.

C. Once inserted, it should not shrink.

D. It should be impervious to moisture.

E. It should be antimicrobial or, at least, unsuitable for microbial growth.

F. It should be radiopaque.

G. It should not stain the tooth structure.

H. It should be sterile or capable of being easily and quickly sterilized.

I. It should not irritate the periapical tissues.

J. If necessary, it should be easy to remove.

Being established the ideal profile of a filling material, it is possible to point the ideal parameters for research and development of new products, as well as the evaluation of those already on the market.

1.2. MTA Fillapex

MTA Fillapex is an endodontic sealer based on MTA, developed by Angelus (Londrina/Parana/Brazil) and launched commercially in 2010. It is a new product that combines the proven advantages of MTA with a superior canal obturation product. Its formulation in the paste/paste system allows a complete filling of the entire root canal, including accessory and lateral canals.

MTA, present in the composition of MTA Fillapex, is more stable than calcium hydroxide, providing constant release of calcium ions for the tissues and maintaining a pH which elicits antibacterial effects. The tissue recovery and the lack of inflammatory response are optimized by the use of MTA and disalicylate resin. The product is eugenol free and will not interfere with adhesive procedures inside the root canal. Also, it does not cause discoloration of the tooth structure.

MAIN FEATURES AND ADVANTAGES

A. **Presence of MTA in the formula:** allows the formation of new tissue, including root cementum;

B. **Biocompatibility:** rapid recovery of tissues without causing inflammatory reaction;

C. **High Radiopacity:** perfect radiographic visualization;

D. **Excellent Flow:** the flowable consistency of MTA Fillapex is engineered to penetrate and also to fill lateral canals;

E. **Setting expansion:** provides excellent sealing of the root canal, avoiding the penetration of tissue fluids and/or bacterial recontamination;

F. **Calcium ion release:** induces rapid tissue regeneration in sites with bone lesion and microbial activity;

G. **System paste x paste:** easy handling and insertion

H. **Working time:** allows adequate working time to be used by specialists and/or general practitioners;

I. **Easy removal:** allows easy removal for retreatment, particularly when used with GP points.

2. COMPOSITION

COMPONENT NAME	CHEMICAL NAME	FUNCTION
PASTE A		
Salicylate resin	Methyl Salicylate Butylene Glycol Colophony	Ionic polymer formation
Bismuth Trioxide	Bismuth Trioxide	Radiopacity
Fumed Silica	Fumed Silicon Dioxide	Filler
PASTE B		
Fumed Silica Titanium Dioxide	Fumed Silicon Dioxide Titanium Dioxide	Filler Pigment
Mineral Trioxide Aggregate (40%)	Tricalcium silicate Dicalcium Silicate Calcium Oxide Tricalcium Aluminate	Active ingredient and responsible for ionic polymer formation
Base resin	Pentaerythritol Rosinate P - Toluenesolfonamide	Plasticity Plasticity

3. PRESENTATION

The product is presented in dual syringes with automix tips or in tubes.



Syringe with automix tip - 4g

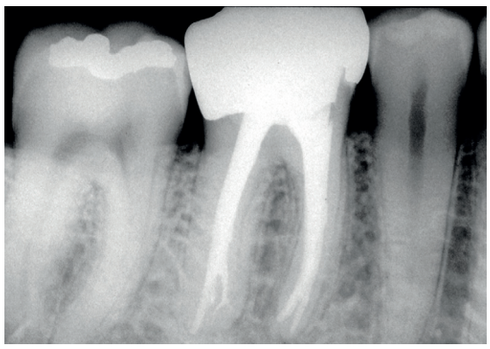


Base paste tube - 18g
Catalyst paste tube - 12g

4. INDICATIONS

MTA Fillapex is indicated for filling root canals of permanent teeth. It can be inserted with the gutta-percha points or with Lentulo drills.

It can also be used with thermal condensation techniques (heated gutta percha) because the boiling point of MTA Fillapex is 150°C.



Root canal filling performed with MTA Fillapex. (Ramos, CAS et al 2011)

CONTRAINDICATION

In patients with hypersensitivity against the resins or other components of the product.

In perforations, resorption sites and apical plugs (these cases must be filled with MTA Reparative Cement (Angelus MTA)).

5. PHYSICAL, CHEMICAL AND BIOLOGICAL PROPERTIES

5.1. Manipulation and insertion

The MTA Fillapex is paste/paste material presented in automix double syringes or tubes which provide an adequate consistency for the cement insertion in the root canal. The presence of nanoparticles enables a homogeneous mixture and better flow of the product.

5.2. Sealing of root canals

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



(SANTIAGO, GC, 2011)

5.2.1. Flow ISO 6876:2001 Test

1. The two pastes of MTA Fillapex were measured in equal volumes and dispensed in a glass plate.

2. After complete homogenization (±30 s), a volume of 0.05 ml of the mixture was dispensed on the center of a glass plate. At 180±5 s after mixing, a second plate was placed centrally on the top of the sealer, with a 100 g weight on it (total mass on the plate of 120±2 g).

3. Ten minutes after mixing the weight was removed and the maximum and minimum diameters of the compressed disc of MTA Fillapex were measured.

Results:

Table of Flow obtained for each sample and their maximum and minimum diameters

SAMPLES	Ø MAX (mm)	Ø MIN (mm)	AVERAGE (mm)
1	28.80	28.0	28.73
2			28.30
3			29.58
		MEAN VALUE (mm)	29

Conclusion: Each disc had a diameter above the minimal required of 20 mm by ISO 6876:2001.*

5.2.2. Film Thickness ISO 6876:2001 Test

1. Initially we measured the thickness of two glass plates together, using a Mitutoyo Digital micrometer;
2. Then, a portion of the MTA Fillapex previously handled was dispensed in the center of one of the glass plates, covering it with another glass plate;
3. Finally, a weight of 150 N (15 Kg) was applied on the center of the plate;
4. The sealant filled completely the space between the glass plates;
5. After 10 minutes, the thickness of the two glass plates plus the sealing thickness were measured with the aid of a Mitutoyo Digital micrometer.

Results:

Table of data collected in the analysis of film thickness and averages

MEASUREMENTS	1	2	3
Plates measure	9.380	9.380	9.273
Plates measure + Sealing material	9.422	9.422	9.314
Film thickness	36µm	42µm	41µm

Average film thickness: 39.6 µm

Standard Deviation film thickness: 3.2 µm

Conclusion: The film thickness did not exceed 50µm. Therefore the MTA Fillapex meets the requirements according to ISO 6876:2001, with appropriate film thickness and wide safety margin.*

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5.3. Dimensional Change ISO 6876:2001 Test

The MTA Fillapex, unlike resin cements, presents an important characteristic required by the sealing materials, which is the setting expansion.

1. 2g of MTA Fillapex were prepared with 0.02 ml of water and dispensed into a mold to obtain three samples;
2. Two glass plates were pressed up on both surfaces of the mold containing the material. The glass plates were fixed with the aid of a device for stabilization;
3. After 5 minutes, the mold was taken to a relative humidity chamber of 95 % to 100% and later placed in dry heat at 37°C to reach the setting time (2h 20min);
4. Setting was confirmed by surface indentation with a Gilmore needle until the sample did not present any visible marks;
5. The samples were polished with 600 grit sandpaper;
6. The samples were measured;
7. These samples were placed in distilled water and in dry heat at 37°C;
8. Thirty days later, the samples were measured again.

Results:

Table Measurements before dimensional change testing

SPECIMEN	MEASURE (mm)
1	13.261
2	13.382
3	13.363

Table Measurements after dimensional change testing

SPECIMEN	MEASURE (mm)
1	13.280
2	13.379
3	13.363

The values obtained before and after dimensional changes testing were calculated in percentage to obtain the value of dimensional change for each sample.

Sample 1 - showed 0.1% expansion

Sample 2 - showed 0.022% shrinkage

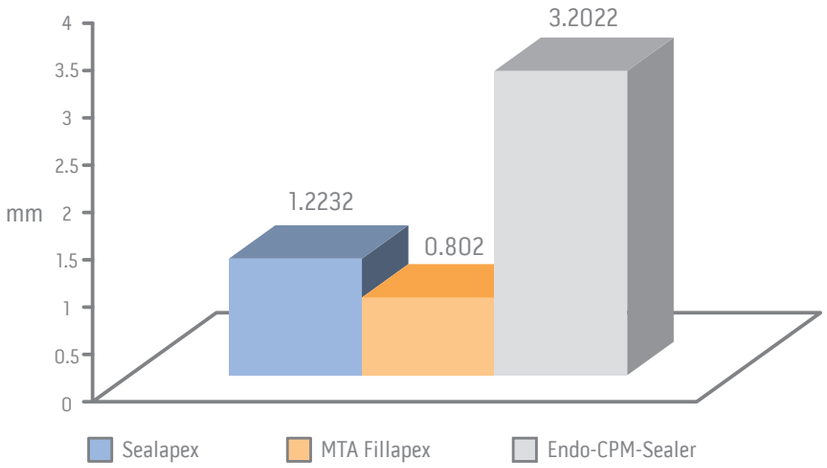
Sample 3 - showed 0.022% expansion

Average overall dimensional change (from 3 specimens) = 0.088%

Conclusion: ISO sets that the average dimensional change of the material should not exceed 1.0% shrinkage or 0.1% expansion. Thus it is concluded that the material fulfilled the requirements standardized by ISO, considering each sample individually, as well as the average change in the material adding all samples tested.*

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

Average results of apical leakage



IN VITRO EVALUATION OF APICAL LEAKAGE OF ENDODONTICS CEMENTS: MTA FILLAPEX®, ENDO-CPM-SEALER® E SEALAPEX®. Moreira J.V, Gomes Filho, J.E., Watanabe,S, Rodrigues, G.B. – Campus de Araçatuba – Faculdade de Odontologia de Araçatuba – 2010.

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5.4. Solubility

The solubility test was performed in 3 samples accoding test ISO 6876:2001.

Results:

Table of initial measurements of the specimens and Petri plate

MATERIAL	WEIGHT (g)
Specimen 1	1.02708
Specimen 2	1.13590
Specimen 3	1.18978
Petri plate	46.85867

Table of Final measurements of the specimens and Petri plate after solubility phenomenon

MATERIAL	WEIGHT (g)
Specimen 1	1.02078
Specimen 2	1.13698
Specimen 3	1.18296
Petri plate	46.90603

The final variation after solubility was 0.1%.

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%.

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%.*

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5.5. Antimicrobial Action

The use of materials that provide high alkalinity favors hard tissue mineralization as well as offers good antimicrobial activity. MTA-based sealers present alkaline pH and high calcium ion releasing (KUGA,MC, 2011).

Mean and standard deviation
of the pH regarding to the analysis time period

TIME PERIOD	MTA FILLAPEX
24 hours	9.39 (0.30)
7 days	7.68 (0.23)
14 days	8.89 (0.54)

Mean concentration and standard deviation of
calcium releasing regarding to analysis time period

TIME PERIOD	MTA FILLAPEX
24 hours	9.15 (4.03)
7 days	8.95 (2.43)
14 days	9.68 (3.00)

5.6. Ease of removal

MTA Fillapex can be removed with chemical or mechanical intervention or a combination of both. Solvents based on citrus oils and chloroform substances can be used.

Research on removal of lateral condensation root canal fillings with files and eucalyptol has shown that MTA Fillapex is easier to remove than other cements (AH Plus, Sealapex, Real Seal e Endofill) (SANTOS , LGP, 2011).

5.7. Radiopacity ISO 6876:2001 Test

1. MTA Fillapex was mixed according to the manufacturer's instructions and placed in the mold.
2. The covers on the top and bottom were pressed to make a 1mm thick sample.
3. The sample was placed in the center of an X-ray film adjacent to the step wedge.
4. The system was irradiated in accordance with ISO 6876:2001.
5. After developing, fixing and drying the exposed film, the densities of the image of the sample and the step wedge were compared using Image J.
6. The results were expressed in millimeters of aluminum.

Results:

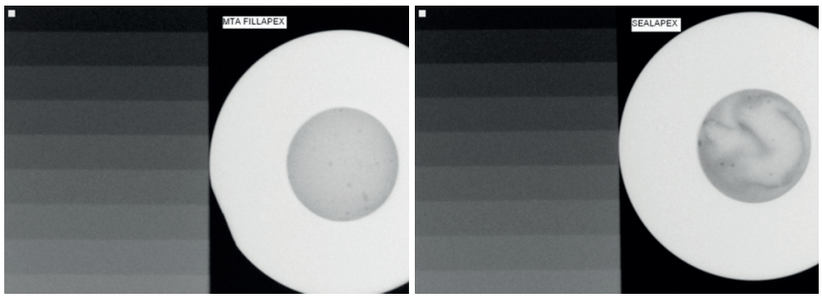
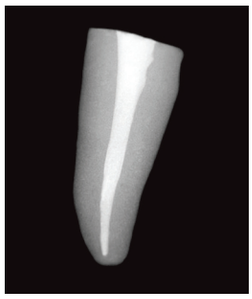


Figure with X-ray images of MTA Fillapex and Sealapex compared to the aluminum scale



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

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 whereas Sealapex presented a value 114% to the minimal required by the norm.

Conclusion: Even though MTA Fillapex presented a higher radiopacity to Sealapex, both products are in compliance with ISO 6876:2001.*

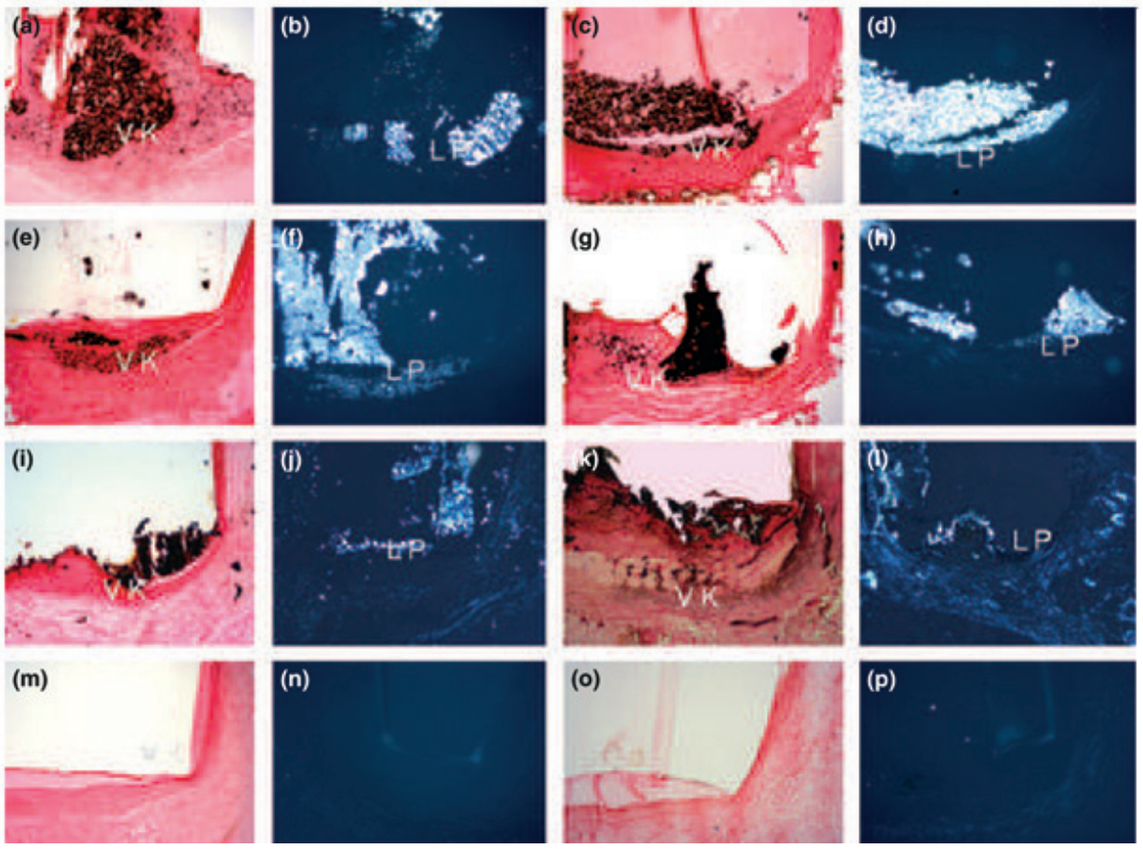
Research study performed according to ADA Norm 57 shows that MTA Fillapex fulfills all required specifications with a better performance when compared to other products (VIDOTTO, APM, 2011).

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5.8. Biocompatibility

The biological properties inherent to conventional MTA used for treatment of root perforations replicates in MTA Fillapex. When in contact with water, CaO can be converted into $Ca(OH)_2$ and dissociated into Ca^{+2} and OH. The diffusion of hydroxyl ions from the root canal increases the pH at the surface of the root adjacent to the periodontal tissues, possibly interfering with osteoclastic activity and promoting alkalinization in the adjacent tissues, which favors healing. Calcium ions participate in the activation of calcium-dependent adenosine triphosphatase and react with carbonic gas to form calcium carbonate crystals (birefringent to polarized light), which serve as a nucleus for calcification and favor mineralization. A rich extracellular network of fibronectin in close contact with these crystals strongly supports the role of calcite crystals and fibronectin as an initiating step in the formation of a hard tissue. Calcium is also needed for cell migration and differentiation. Because MTA Fillapex and MTA have similar chemical composition and elicit similar tissue reactions, it is expected that MTA Fillapex will act similarly to MTA when used in clinical situations, but be easier to handle because of its paste/paste presentation.

MTA Fillapex is considered a great material for root canal treatment, considering its bioactive potential. MTA Fillapex clearly shows the ability to stimulate nucleation sites for the formation of apatite crystals in human osteoblast-like cell culture.



After 30 and 90 days, note the presence of dystrophic calcification on the tube opening with Sealapex® (a,c, respectively), FILLAPEX® (e,g), Angelus MTA® (i,k), but not with Control (m,o). Von Kossa 100x. After 30 and 90 days, observe the presence of birefringent structures to polarized light, confirming the mineralization induction with Sealapex® (b,d, respectively), FILLAPEX® (f,h), Angelus MTA (j,l), but not with Control (n,p). Polarized light 100x.
Rat tissue reaction to MTA FILLAPEX - Dental Traumatology 2011; doi: 10.1111/j.1600-9657.2011.01096. Gomes-Filho, J.E ET al Department of Endodontics, Arac¸atuba School of Dentistry, University of Estadual Paulista, São Paulo, Brazil

5.9 Working Time and Setting Time

5.9.1 Working time Test ISO 6876:2001

1. The two pastes of MTA Fillapex were measured in equal volumes and dispensed in a glass plate.
2. After complete homogenization (±30 s), a volume of 0.05 ml of the mixture was dispensed on the center of a glass plate using a graduated syringe.
3. At increasing intervals after mixing and the setting time of MTA Fillapex, a second plate was placed centrally on the top of the sealer, with a 100 g weight (total mass on the plate: 120±2 g).
4. When the sample diameter was 10% less than the flow value determined previously, the working time was established.

Results:

Table of sample diameter obtained for each sample

TIME (min)	Ø (mm)
10 (flow)	29
30	26.86
35	26.13
35	26.47
35	25.91
37	25.20

Mean value at 35 min = 26.17 mm (9.8% less than the flow value)

Conclusion: When determined in accordance with ISO 6876:2001, MTA Fillapex presented working time of 35 minutes.*

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5.9.2. Setting Time Test ISO 6876:2001.

1. Moulds were made of gypsum, which were dried at 37°C and 95% relative humidity for 24 hours.
2. Then, the MTA Fillapex was mixed in accordance with the directions for use and dispensed in the gypsum matrix to obtain samples.
3. 40 minutes after filling of the cavity, the first indentation with a Gilmore needle was performed.
4. The operation was repeated in 10 minute intervals until it was no longer possible to visualize the deformation or change in the sample surface.

Results:

This method was performed three times, under controlled temperature (25°C) and humidity (<60%) and the results were expressed in minutes.

Table - Evaluation of setting times. Results of the three repetitions of the indentation test

SPECIMEN	BLOCK 1	BLOCK 2	BLOCK 3
Time (min)	120	130	140

Setting time average: 130 minutes

Standard Deviation: 10 minutes

Conclusion: The root canal sealer tested showed average setting time of 130 minutes (2 hours and 10 minutes) with a variation of ±10 minutes. 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.*

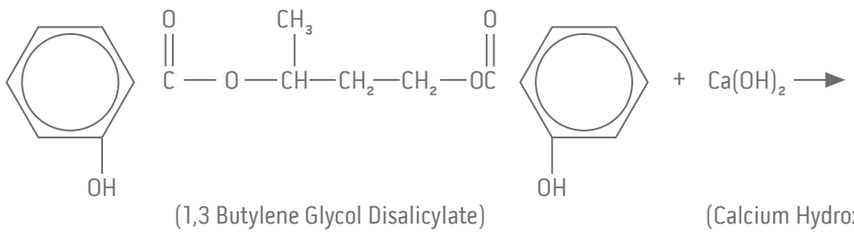
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5.9.3. Complexation Reaction

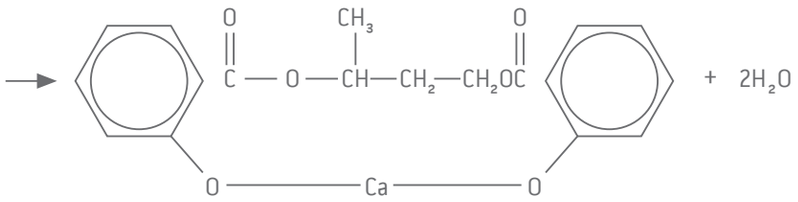
For the understanding of the chemical process that provides the setting of MTA Fillapex, it is necessary to understand the complexation reaction.

Complexation is an electrostatic attraction between an ion and a chelating agent so that occurs no electron transfer between them. In this process the final structure will charge the sum of the individual charges for each participant of the complex.

Complexation reaction in MTA Fillapex



(1,3 Butylene Glycol Disalicylate) (Calcium Hydroxide)



(Calcium Disalicylate)

H. R. Stanley, T. Lundy: Dycal therapy for pulp exposures, Oral Surg. Vol. 34 Number 5: 818-827, 1972.

The chemical reaction that promotes setting in MTA Fillapex is not a polymerization reaction between pastes but a complexation reaction.

The complexation reaction is an autocatalytic process. To get started, there must be a molecule of water from the external medium which, when forming the first complex, promotes a chain reaction and a new water molecule is generated (acid reaction + base = salt + water). Therefore the reaction has an intrinsic process of self-acceleration. The complexation reaction is also a chelation reaction where $Ca(OH)_2$ contacts the disalicylate resin, resulting in the entrapment of calcium ions in the compound.

Therefore, for this reaction, besides the salicylate, another component is fundamental: $Ca(OH)_2$. The major source of $Ca(OH)_2$ responsible for the MTA Fillapex reaction is from the hydration of free CaO which is in a high concentration in the formula.

It is therefore concluded that the moisture present in the dentin tubules hydrates free CaO, forming $Ca(OH)_2$ which will react with the salicylate and promote the setting.

6. CLINICAL EVALUATION

Clinical studies with MTA Fillapex demonstrated the absence of post-operative pain after a short period of time, in different clinical situations, as shown below:

Post-op in different periods of time (%)
MTA Fillapex single visit (126 cases)
Irreversible pulpitis with painful symptoms

	IMMEDIATE	24 HOURS	72 HOURS	1 WEEK
Without pain	66%	84%	98%	100%
Moderate pain	24%	12%	2%	
Severe pain	10%	4%		

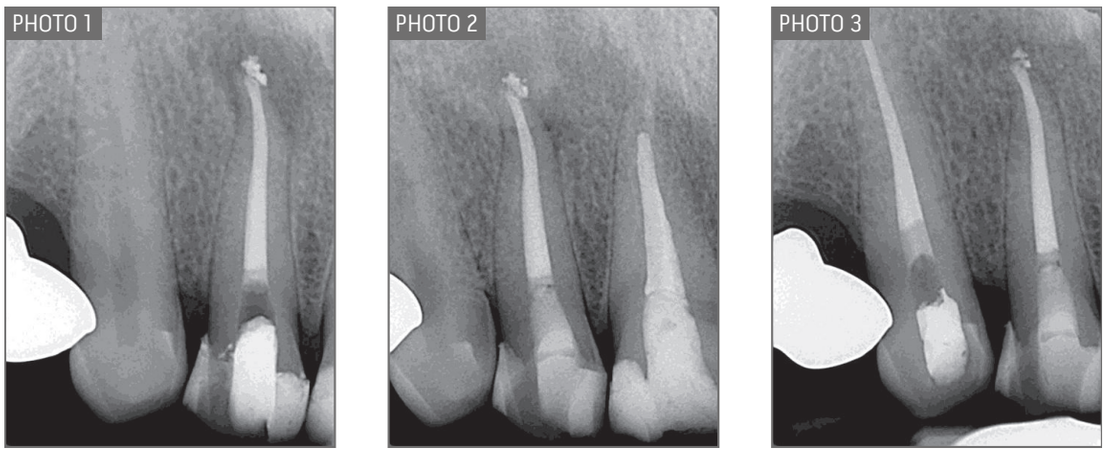
Ramos, C.A.S.; Brochado, V.H.D.; Prescinotti, R.

Post-op in different periods of time (%)
MTA Fillapex single visit (84 cases)
Necrosis without painful symptoms

	IMMEDIATE	24 HOURS	72 HOURS	1 WEEK
Without pain	84%	92%	98%	100%
Moderate pain	16%	8%	2%	
Severe pain				

Ramos, C.A.S.; Brochado, V.H.D.; Prescinotti, R.

Quick recovery of pre-existing periapical lesions (before endodontic treatment) has also been observed after use of MTA Fillapex.



Clinical case with MTA Fillapex: Initial RX (Photo 1), 4 months P.O (Photo 2) 14 months P.O (Photo 3) (SELLERA, D.P, 2011).

7. TECHNIQUE FOR USE

A. **Root canal preparation:** Prior to insertion of MTA Fillapex, the root canal should be prepared, cleaned and dried, according to the selected endodontic technique.

B. **Mixing:** Performed by the self-mixing tip attached to the syringe. Use the cement immediately after mixing and dispensing by the syringe.

Warning: the self-mixing tip must be discarded after use.

C. **Insertion:** Use MTA Fillapex with gutta-percha or silver points, coating them with a thin layer of the cement and filling the root canal according to the selected technique. MTA Fillapex can be applied in the root canal with a Lentulo spiral or, directly, with an applicator tip adapted to the self-mixing tip.

Removal of the root canal filling: Use the conventional techniques for the removal of gutta-percha fillings.

Working time: 35 minutes.

Setting time: Minimum of 120 minutes (two hours).

WARNINGS AND STORAGE

- MTA Fillapex contains resins which may sensitize susceptible individuals. Do not use it in patients allergic to the resins or other components of the product.
- Avoid contact with eyes or skin. In case of contact, rinse immediately with water.
- Avoid contact with oral mucosa. In case of contact, rinse with water and prevent swallowing of product. In case any sensitivity persists, seek medical attention promptly.
- If the syringe becomes contaminated with saliva or blood during application, dispose of the syringe and do not use on an additional patient.
- Keep in dry and cool place, away from humidity and sources of heat.
- Do not store in the refrigerator.

PRECAUTIONS

During the use of this product, it is recommended the patient and professional use suitable protective clothing, eye protection and gloves.

8. PUBLICATIONS

1. BIN C V; VALERA M C, CAMARGO S E A, RABELO S B, SILVA G O, BALDUCCI I, CAMARGO C H R, Cytotoxicity and Genotoxicity of Root Canal Sealers Based on Mineral Trioxide Aggregate Endod 2012; 38:495–500
2. BORGES, R.P., Avaliação da solubilidade de cimentos obturadores dos canais radiculares à base de silicato de cálcio – Tese de Doutorado da Universidade de Ribeirão Preto (UNAERP), área de concentração Endodontia, Ribeirão Rreto, 2011
3. BRAIT, A H, Cirurgia paraendodôntica com retroinstrumentação ultrassônica e retrobturação com Fillapex/MTA http://4.bp.blogspot.com/_LAB4OW-pjXk/TBy8kPflw6I/AAAAAAAAAXM/aAUNIx2GC5s/s1600/Slide1.JPG
4. COLLARES KF, CAMARGO-JUNIOR AS, KNABACH CB, OLIVEIRA LP, JARDIM PS, JACINTO RC Influência de cimento endodôntico a base de MTA na resistência de união de pinos de fibra de vidro Brasilian Oral Rearch, PieO15, Volume 25 Supplement 1 September 2011
5. CORNÉLIO ALG, SALLES LP, ROSSA-JUNIOR C, GUERREIRO-TANOMARU JM, TANOMARU-FILHO M Biocompatibilidade e bioatividade do MTA Fillapex em cultura de células ósseas humanas, Brasilian Oral Rearch,PNf 016, Volume 25 Supplement 1 September 2011
6. COSTA CCR, ROCHA VGN, HABITANTE SM, RALDI DP, LAGE-MARQUES JL. Análise da infiltração apical de um novo cimento endodôntico a base de MTA. Cienc Odontol Bras 2009; 12:35-40
7. CUNHA RAG, ROMAGNOLI C, BERGER SB, GUIRALDO RD, MOURA SK, CARVALHO RV, COSTA JM, LOPES MB Propriedades físicas de cimento a base de MTA. Brasilian Oral Rearch,PIc071 Volume 25 Supplement 1 September 2011
8. FARIA-JÚNIOR NB, TANOMARU-FILHO M, BERBERT FLCV, GUERREIRO-TANOMARU JM Atividade antimicrobiana de cimentos obturadores endodônticos sobre biofilme de Enterococcus faecalis Brasilian Oral Rearch, PNe036Volume 25 , Supplement 1 September 2011
9. FERINO, R.V; TANOMARU-FILHO,M.; SILVA,G.F; SASSO-CERRI,E. GUERREIRO-TANOMARU, J.M; CERRI, P.S. Evaluation of a MTA-based sealer histocompatibility in subcutaneous tissue 721 Thursday, June 21, 2012: 11:45 a.m. - 1 p.m IADR 2012
10. GOMES-FILHO J.E, MOREIRA J.V, WATANABE S., LODI C.S., CINTRA L.T.S, DEZAN JUNIOR, E., BERNABÉ P.F.E, NERY M.J, OTOBONI FILHO, J.A Sealability of MTA and calcium hydroxide containing Sealers. J Appl Oral Sci. 2012; 20(3):347-51
11. GOMES-FILHO JE, WATANABE S, BERNABÉ PFE, COSTA MTM. A mineral trioxide aggregate sealer stimulated mineralization. Journal of Endodontics 35:256- 60 (2009)
12. GOMES FIILHO, J E; Rat tissue reaction to MTA FILLAPEX Dental Traumatology 2011; doi: 10.1111/j.1600-9657.2011.
13. KUGA,M.C. et al. Hydrogen ion and calcium releasing of MTA Fillapex® and MTA-based formulations. RSBO. 2011 Jul-Sep; 8(3):271-6

14. MEIRELLES VIDOTTO, A.p.; SANCHES CUNHA, R; GREGATTO ZEFERINO, E; GUIMARÃES P.R.D; SIGRIST DE MARTIN, A; DA SILVEIRA BUENO,C.E. Comparison of MTA Fillapex radiopacity with five root canal sealers RSBO Revista Sul-Brasileira de Odontologia, vol. 8, núm. 4, octubre-diciembre, 2011, pp. 404-409

15. MOREIRA, J.V; GOMES-FIHO, J.E.; WATANABE, S. RODRIGUES, G.B. Avaliação in vitro da infiltração apical dos cimentos endodônticos: MTA Fillapex®, Endo-CPM-Sealer® e Sealapex®. – Campus de Araçatuba – Faculdade de Odontologia de Araçatuba – Odontologia –2010

16. MORGENTAL RD, VIER-PELISSER FV, OLIVEIRA SD, ANTUNES FC, COGO DM, KOPPER PM Avaliação da resistência de união à dentina dos cimentos à base de MTA e à base de resina epóxica, através do teste de micro push-out ,.; Antibacterial activity of two MTA-based root canal sealers. Int Endod J. 2011 Dec; 44(12):1128-33

17. MOTTA JUNIOR, A.G. Caracterização química de fases cristalográficase físicas dos cimentos MTA Fillapex, AH Plus, Sealer 26 e Endofill. Tese apresentada como requisito parcial para obtenção do título de Doutor, ao Programa de Pós-Graduação em Odontologia, da Universidade do estado do Rio de Janeiro. Área de concentração Endodontia. 2011.

18. NASCIMENTO, C.A; GUERREIRO TANOMARU,J.M; FARIA-JUNIOR,N.B; TANOMARU-FILHO,M. pH, Solubility and Antibacterial Activity Against Biofilm of Endodontic Sealers 164291 Friday, June 22, 2012: 11:45 a.m. - 1 p.m. IADR 2012

19. PORFIRIO R, MINOTTI PG, NUNES E, SILVEIRA FF, SOARES JA, MORAES IG, ORDINOLA-ZAPATA R, DUARTE MAH. Análise da solubilidade, pH e liberação de cálcio de quatro cimentos endodônticos. Brasilian Oral Rearch, PIb 010 Volume 25 , Supplement 1 September 2011

20. QUEIROZ FF, BRUM CBB, BRUM JR, SENA NT Estudo in vitro da atividade antimicrobiana de cimentos endodônticos frente ao Enterococcus faecalis Brasilian Oral Rearch, AO 012 - Volume 25 • Supplement 1 September 2011

21. RESENDE, M. A. M. Estudo in vitro das propriedades físico-químicas, escoamento e tempo de presa do MTA Fillapex em comparação com dois cimentos endodônticas: 2012. 58 f. Monografia (Graduação em Odontologia) - Centro Universitário de Lavras, Lavras, 2012

22. SAĞSEN,B.; ÜSTÜN,Y.; PALA, K; DEMİRBUĞA, S. Resistance to fracture of roots fi lled with different sealers. Dental Materials Journal 2012; 31(4): 528–532SALLES LP, GOMES-CORNÉLIO AL, GUIMARÃES FC, HERRERA BS, BAO SN, ROSSA-JUNIOR C, GUERREIRO-TANOMARU JM, TANOMARU-FILHO M. Mineral trioxide aggregate-based endodontic sealer stimulates hydroxyapatite nucleation in human osteoblast-like cell culture. J Endod. 2012 Jul; 38(7):971-6. Epub 2012 Apr 6.

23. SALLES,L.P; CORNÉLIO,A.L; GUERREIRO-TANOMARU J.M., TANOMARU-FILHO, M. Bioactivity of MTA Fillapex in Human Osteoblast-Like Cells 882 Thursday, June 21, 2012: 11:45 a.m. - 1 p.m IADR 2012

24. SANTIAGO, G.C. Estudo comparativo "in vitro" de selamento apical utilizando as técnicas de Condensação Lateral e Híbrida de Tagger com os cimentos Pulp Canal Sealer e MTA Fillapex - Monografia apresentada ao Curso de Especialização da Faculdade de Pós graduação FAISA/

CIODONTO, Sete LagoasMG, como requisito parcial para obtenção do título de Especialista - Faculdade de Sete Lagoas, 2010.

25. SANTOS LGP, TEDESCO M, FELIPPE WT, FREITAS SFT, TEIXEIRA CS, BORTOLUZZI EA, FELIPPE MCS Retratamento endodôntico: Avaliação ex vivo da presença de remanescentes de diferentes materiais obturadores Brasilian Oral Rearch, PNe014, Volume 25 Supplement 1 September 2011

26. SCELZA, M.C, LINHARES A.B, DA SILVA L.E., J. GRANJEIRO, M. ALVES, G.G. A multiparametric assay to compare the cytotoxicity of endodontic sealers with primary human osteoblasts. International Endodontic Journal, 45, 12–18, 2012

27. SILVA, R. S. F. et al. Análise histológica tecidual frente a um novo cimento endodôntico à base de MTA. São Paulo: Braz. Oral. Res. , 2006. p. 220 In: SBPQO 2006, Atibaia.

28. SPIRONELLI RAMOS, C.A. ET al. Tratamento endodôntico utilizando-se o MTA Fillapex® como cimento obturador: relato de um caso clínico .Publicado em 14 de Março de 2011 Odontocase in: <<http://www.odontocases.com.br/Cases/5/endodontia/61/tratamento-endodontico-utilizando-se-o-mta-fillapex®-como-cimento-obturador>>

29. VEDOVELLO, G.; KAMACHI,J. Caso de Retratamento com obturação do Cimento MTA Fillapex - http://eecampinas.blogspot.com.br/ 2011

30. VIAPIANA R, BOSSO R, REIS JMSN, GUERREIRO-TANOMARU JM, TANOMARU-FILHO M Radiopacidade e escoamento dos cimentos endodônticos AH Plus, Endo CPM Sealer, Fillapex, Sealapex, Epiphany e Epiphany SE. Brasilian Oral Rearch,PNf026, Volume 25 Supplement 1 September 2011

31. VOGT,B.F. Efeito do agregado trióxido mineral intracanal em um modelo de reimplante tardio em dentes de ratos - análise histológica e imunoistoquímica. Tese apresentada como parte dos requisitos para a obtenção do título de Doutor em Odontologia, Área de Concentração em Cirurgia e Traumatologia Bucomaxilofacial, pelo Programa de Pós-Graduação da Faculdade de Odontologia da Pontifícia Universidade Católica do Rio Grande do Sul 2011

32. WATANABE S, GOMES-FILHO JE, CINTRA LTA, BERNABÉ PFE, LODI CS, DEZAN-JUNIOR E, NERY MJ, OTOBONI-FILHO JÁ Reação do tecido conjuntivo de rato ao novo cimento a base de MTA Brasilian Oral Rearch, PNd025, Volume 25 Supplement 1 September 2011

33. ZAGO BAA, TRUIZ CF, ARAÚJO MC, HIRATA BS, RAMOS CAS; Cimento obturador MTA Fillapex- Caso clínico - UEL 2011

Sealability of MTA and calcium hydroxide-containing sealers

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ABSTRACT

Objectives: The aim of this study was to evaluate the apical sealability of Fillapex®, Endo-CPM-Sealer® and Sealapex®. Material and Methods: Ninety-four freshly extracted single-rooted teeth were selected and decoronated. All teeth were radiographed to confirm the existence of a single and straight root canal, which was prepared using Protaper Universal and 2.5% sodium hypochlorite. The teeth were randomly divided in groups of 10 specimens each according to the sealer, and the canals were filled using the single cone technique and one of the sealers. Four additional teeth were used as controls. The teeth were submitted to dye leakage with Rhodamine B for 24 h but using vacuum on the initial 15 min. Thereafter, they were cut longitudinally and the leakage was measured in a linear fashion from apex to crown. Data were analyzed by ANOVA and Tukey's tests at 5% significance level. Results: Fillapex® and Sealapex® showed significantly less dye leakage than Endo-CPM-Sealer® ($p<0.05$). Conclusions: It was concluded that Fillapex® and Sealapex® were able to prevent apical dye leakage differently from Endo-CPM-Sealer®.

Key words: Root canal filling material. Leakage. Fillapex.

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Original Research Article

Hydrogen ion and calcium releasing of MTA Fillapex® and MTA-based formulations

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***Keywords*:**
MTA; pH; calcium; sealer.

Abstract

Introduction: MTA is composed of various metal oxides, calcium oxide and bismuth. It has good biological properties and is indicated in cases of endodontic complications. Several commercial formulations are available and further studies are necessary to evaluate these materials. **Objective:** To evaluate pH and calcium releasing of MTA Fillapex® compared with gray and white MTA. **Material and methods:** Gray and white MTA (Angelus) and MTA Fillapex® (Angelus) were manipulated and placed into polyethylene tubes and immersed in distilled water. The pH of these solutions was measured at 24 hours, 7 days and 14 days. Simultaneously, at these same aforementioned periods, these materials' calcium releasing was quantified, through atomic absorption spectrophotometry. The results were submitted to ANOVA, with level of significance at 5%. **Results:** Concerning to pH, the materials present similar behaviors among each other at 24 hours ($p > 0.05$). At 7 and 14 days, MTA Fillapex® provided significantly lower pH values than the other materials ($p < 0.05$). Regarding to calcium releasing, at 24 hours and 7 days, MTA Fillapex® provided lower releasing than the other materials ($p < 0.05$). After 14 days, differences were found between MTA Fillapex® and gray MTA ($p < 0.05$). **Conclusion:** All materials showed alkaline pH and calcium releasing, with significantly lower values for MTA Fillapex® sealer.

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Original Research Article

Comparison of MTA Fillapex radiopacity with five root canal sealers

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Received for publication: February 4, 2011. Accepted for publication: March 30, 2011.

Keywords: obturation; root canal sealer; radiopacity.

Abstract

Introduction: The endodontic sealer is a filling material whose physicochemical properties are mandatory for the achievement of endodontic therapy final goal. An ideal endodontic sealer should have some properties, including radiopacity. **Objective:** This study compared MTA Fillapex™ radiopacity with the radiopacity of five others endodontic sealers: Endométhasone-N™, AH Plus™, Acroseal™, Epiphany SE™ and RoekoSeal™. **Material and methods:** Five cylindrical samples of each sealer were used, constructed with the aid of a matrix. On an occlusal film, a sample of each sealer was placed along with an aluminum stepwedge and five radiographic shots were taken. The radiographic images were digitized and each sample's gray scales were compared with each shade of the aluminum stepwedge, by using software. **Results:** The results, in decreasing order of radiopacity, were: AH Plus™ was statistically the most radiopaque sealer (9.4 mm Al), followed by Epiphany SE™ (7.8 mm Al), MTA Fillapex™ (6.5 mm Al), RoekoSeal™ (5.8 mm Al), Endométhasone-N™ (4.5 mm Al), and Acroseal™, the least statistically radiopaque (3.5 mm Al). **Conclusion:** It can be concluded that MTA Fillapex™ was the third most radiopaque sealer among all tested sealers. Also, MTA Fillapex™ has the radiopacity degree in agreement with ADA specification No. 57 (1983).

Dental Traumatology

Dental Traumatology 2011; doi: 10.1111/j.1600-9657.2011.01096.x

Rat tissue reaction to MTA FILLAPEX®

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Accepted 6 November, 2011

Abstract – The aim of this study was to evaluate the rat subcutaneous tissue reaction to implanted polyethylene tubes filled with mineral trioxide aggregate (MTA) FILLAPEX® compared to the reaction to tubes filled with Sealapex® or Angelus MTA®. These materials were placed in polyethylene tubes and implanted into the dorsal connective tissue of Wistar rats for 7, 15, 30, 60, and 90 days. The specimens were stained with hematoxylin and eosin or Von Kossa or left unstained for examination under polarized light. Qualitative and quantitative evaluations of the reaction were performed. All materials caused moderate reactions after 7 days, which decreased with time. The reactions were moderate and similar to that evoked by the control and Sealapex® on the 15th day. MTA FILLAPEX® and Angelus MTA caused mild reactions beginning after 15 days. Mineralization and granulation birefringent to polarized light were observed with all materials. It was concluded that MTA FILLAPEX® was biocompatible and stimulated mineralization.

Basic Research—Biology

Mineral Trioxide Aggregate–based Endodontic Sealer Stimulates Hydroxyapatite Nucleation in Human Osteoblast-like Cell Culture

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Abstract

Introduction: The main purpose of this study was to evaluate the biocompatibility and bioactivity of a new mineral trioxide aggregate (MTA)-based endodontic sealer, MTA Fillapex (MTA-F; Angelus, Londrina, Brazil), in human cell culture. **Methods:** Human osteoblast-like cells (Saos-2) were exposed for 1, 2, 3, and 7 days to MTA-F, Epiphany SE (EP-SE; SybronEndo, Orange, CA), and zinc oxide–eugenol sealer (ZOE). Unexposed cultures were the control group (CT). The viability of the cells was assessed by MTT assay and the morphology by scanning electron microscopy (SEM). The bioactivity of MTA-F was evaluated by alkaline phosphatase activity (ALP) and the detection of calcium deposits in the culture with alizarin red stain (ARS). Energy-dispersive X-ray spectroscopy (EDS) was used to chemically characterize the hydroxyapatite crystallites (HAP). Saos-2 cells were cultured for 21 days for ARS and SEM/EDS. ARS results were expressed as the number of stained nodules per area. Statistical analysis was performed with analysis of variance and Bonferroni tests ($P < .01$). **Results:** MTA-F exposure for 1, 2, and 3 days resulted in increased cytotoxicity. In contrast, viability increased after 7 days of exposure to MTA-F. Exposure to EP-SE and ZOE was cytotoxic at all time points. At day 7, ALP activity increase was significant in the MTA-F group. MTA-F presented the highest percentage of ARS-stained nodules (MTA-F > CT > EP-SE > ZOE). SEM/EDS analysis showed hydroxyapatite crystals only in the MTA-F and CT groups. In the MTA-F group, crystallite morphology and chemical composition were different from CT. **Conclusions:** After setting, the cytotoxicity of MTA-F decreases and the sealer presents suitable bioactivity to stimulate HAP crystal nucleation. *(J Endod 2012;■:1–6)*

Key Words

Bioactivity, biocompatibility, hydroxyapatite, mineral trioxide aggregate sealer

Mineral trioxide aggregate (MTA) emerged as the material of choice for root perforation repairs and root-end fillings in the 90s, a revolutionary period marked by many advances in endodontics (1). MTA was developed at Loma Linda University and received approval from the Food and Drug Administration for human use in 1998 (2, 3). Since then, MTA has shown excellent biological properties in several *in vivo* and *in vitro* studies (4–9). In cell culture systems, for example, MTA has been shown to enhance proliferation of periodontal ligament fibroblasts (6), to induce differentiation of osteoblasts (7, 8), and to stimulate mineralization of dental pulp cells (9). This biocompatibility and bioactive potential raised the interest of scientists worldwide to improve the handling characteristics and some physicochemical properties of MTA with the intention of expanding its applicability in endodontics. Consequently, new MTA-based root-end filling cements and root canal sealers have been proposed (10–12), such as MTA Fillapex (MTA-F; Angelus, Londrina, Brazil).

The new MTA-based sealers reflect a current requirement to have materials for endodontic therapy that are able to stimulate the healing process of periapical tissues, instead of merely biocompatible or inert materials. As a result, MTA-F represents the effort in combining a material of excellent biological properties as MTA with resins and other components to improve diverse required properties of an endodontic sealer including adhesiveness, dimensional stability, working time, radiopacity, flow, and antibacterial effects. According to the manufacturer's information, MTA-F is composed of salicylate resin, resin diluent, natural resin, bismuth oxide as radiopacifying agent, silica nanoparticles, MTA, and pigments. The MTA itself consists of fine hydrophilic particles of tricalcium silicate, tricalcium aluminum oxide, tricalcium oxide, gypsum (calcium sulfate dihydrate), and other mineral oxides (3). Gypsum is an important determinant of setting time. MTA cements generally contain less gypsum to allow more handling time. Unfortunately, MTA-F data sheet lacks details about the natural resin, pigments, and diluents composition.

It is important to investigate if the combination of these resins and other constituents influence the bioactive potential of MTA in the new endodontic sealer. Therefore, the main purpose of this study was to evaluate the biocompatibility and the bioactivity of MTA-F in stimulating mineralization in Saos-2 cell culture compared with Epiphany SE

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Start | Browse by Day | Author Index | Keyword Index

721 Evaluation of a MTA-based sealer histocompatibility in subcutaneous tissue

Thursday, June 21, 2012: 11:45 a.m. - 1 p.m.
Location: Poster Hall (Convention Center)
Presentation Type: Poster Session

R.V. FERINO, *M. TANOMARU-FILHO, G.F. SILVA, E. SASSO-CERRI, J.M. GUERREIRO-TANOMARU, and P.S. CERRI, Dentística Restauradora, FACULDADE DE ODONTOLOGIA DE ARARAQUARA, UNESP Univ Estadual Paulista, Câmpus Araraquara, Araraquara / SP, Brazil*

Objective: Mineral Trioxide Aggregate (MTA) has been widely used in endodontic treatment due to its good marginal adaptation and biocompatibility. In attempt to associate physicochemical properties of a root canal sealer with MTA biocompatibility, some modifications have been made with the aim to improve its use as a root canal sealer. Thus, the tissue reaction promoted by a MTA-based sealer (MTA-Fillapex) in rat subcutaneous was investigated by morphological and morphometric analyses

Method: Eighty rats were distributed into 4 groups (n=20); in each animal, a polyethylene tube filled with MTA-Fillapex, MTA, AH-Plus or Fill Canal was implanted in the dorsal subcutaneous. After 7, 15, 30 and 60 days, the tubes surrounded by connective tissue were removed, fixed and embedded in paraffin. In the HE-stained sections, the numerical density of inflammatory cells (IC) in the capsule was evaluated and statistical analyses were performed using ANOVA and Tukey's test ($p \leq 0.05$). Sections were also submitted to von Kossa method for detection of calcified structures

Result: At 7 and 15 days, the number of IC was significantly higher in the capsule of the MTA-Fillapex in comparison to other materials. However, significant reduction in the number of IC was verified in the capsule of the MTA-Fillapex in the 30 and 60 days when compared to the initial periods. At 60 days, the inflammatory reaction promoted by MTA-Fillapex was similar to MTA and significantly lower than Fill Canal. Otherwise, a gradual and significant increase was observed in the number of IC in the capsule adjacent to the Fill Canal. von Kossa-positive structures were observed in the capsule adjacent to the MTA-Fillapex, MTA and AH-Plus; positive strucutres were not seen in the capsule surrounding the Fill Canal

Conclusion: The results indicate that the biocompatibility of MTA-Fillapex is similar to MTA

Keywords: Biocompatibility, Dental materials, Endodontics and Root canal fillings

See more of: Biocompatibility and Biologic Effects II
See more of: Dental Materials 5: Biocompatibility and Biologic Effects

<< Previous Abstract | *Next Abstract*

Abstracts Author Index Keyword Index Search Help Main Menu

89TH GENERAL SESSION & EXHIBITION OF THE IADR • SAN DIEGO CONVENTION CENTER • SAN DIEGO, CALIFORNIA, USA

1164 MTA FILLAPEXÂ® STIMULATED MINERALIZATION

Thursday, March 17, 2011: 3:30 p.m. - 4:45 p.m.
Location: Hall C (San Diego Convention Center)
Presentation Type: Poster Session

J.E. GOMES-FILHO[1], *S. WATANABE*[1], *L.T.A. CINTRA*[1], *C.S. LODI*[2], *E. DEZAN, Jr.*[3], *M.J. NERY*[4], *and P.F.E. BERNABÉ*[1], [1]*Endodontics, Universidade Est. Paulista Julio Mesquita, Araçatuba, Brazil,* [2]*Pediatric Dentistry, Universidade Est. Paulista Julio Mesquita, Araçatuba, Brazil,* [3]*Endodontics, Universidade Est. Paulista Julio Mesquita, Aracatuba, Brazil,* [4]*Endodontis, Universidade Est. Paulista Julio Mesquita, Araçatuba, Brazil*

Objectives: The aim of this study was to evaluate the rat subcutaneous tissue response to implanted polyethylene tubes filled with MTA Fillapex® (Angelus, Londrina, Brazil) compared Endo-CPM-Sealer® (Portland Cement Modified Sealer) (EGEO S.R.L., Buenos Aires, Argentina) and Sealapex® (SybronEndo, Glendora, CA). Methods: These materials were placed in polyethylene tubes and implanted into dorsal connective tissue of Wistar rats for 7, 15, 30, 60, and 90 days. The specimens were prepared to be stained with hematoxylin and eosin or Von Kossa or not stained for polarized light. Qualitative and quantitative evaluations of the reaction were performed. Results: All materials caused moderate reactions at 7 days that decreased with time. The response was similar to the control on the 15th day with Endo-CPM-Sealer® and Sealapex®. MTA Fillapex® caused mild reactions from 15 days on. Mineralization and granulations birefringent to the polarized light were observed with all materials. Conclusions: It was possible to conclude that MTA Fillapex® was biocompatible and stimulated mineralization. Supported by FAPESP#2009/11194-5 and #2009/00380-2

Keywords: Animal, Endodontics, MTA, Root canal fillings and Wound healing

See more of: Dental Materials: Biocompatibility and Biologic Effects II
See more of: Dental Materials 5: Biocompatibility and Biologic Effects

<< Previous Abstract | Next Abstract >>

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