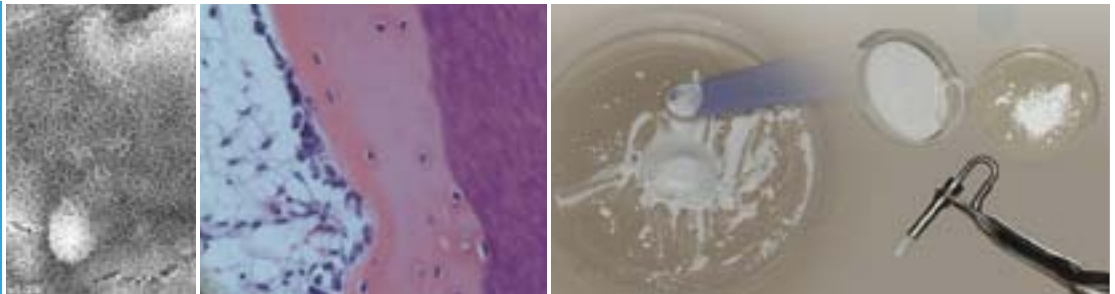


Root Repair & Vital Pulp Therapy

RetroMTA[®]



BioMTA

RetroMTA[®]

RetroMTA is a hydraulic bioceramic material for root repair and vital pulp therapy. RetroMTA consists of fine, hydrophilic particles that set in the presence of water with its compressive strength reaching up to 105 MPa. It uses Calcium Zirconia complex as radio-opacifier.

Its advantages are rapid setting time of 150 seconds in experimental condition but can be controlled up to 10 minutes by the dentists, no washout, no discoloration and perfect sealing ability. It is efficient when used for replantation, apexification, apexogenesis and REP. In ex-vivo study, initial pH is 11.5 and on the 4th week, it reaches up to pH 7.8~8.0. In in-vivo study, there is high potential for biomineralization.



Vital Pulp Therapy & Root Repair



**Fast
Setting**

**No
Discoloration**

**No
Heavy Metal**

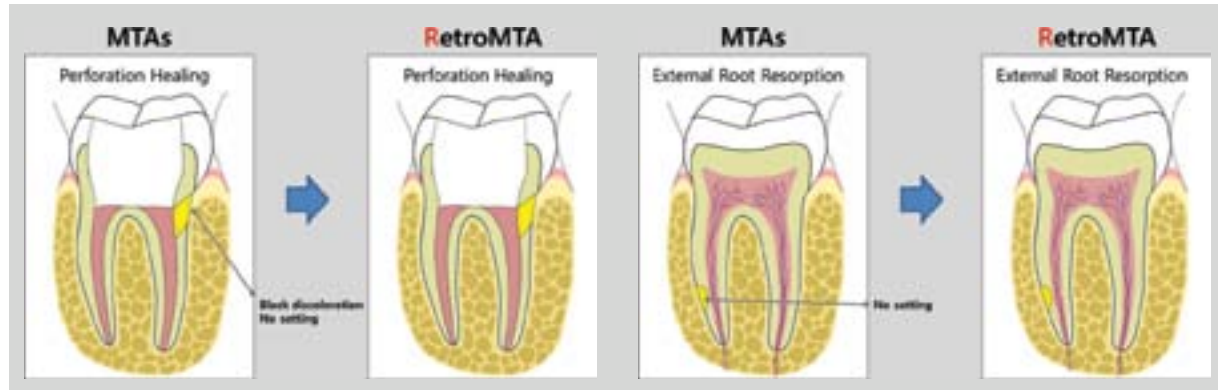
**No
Cell Toxicity**

**Good
Handling Properties**

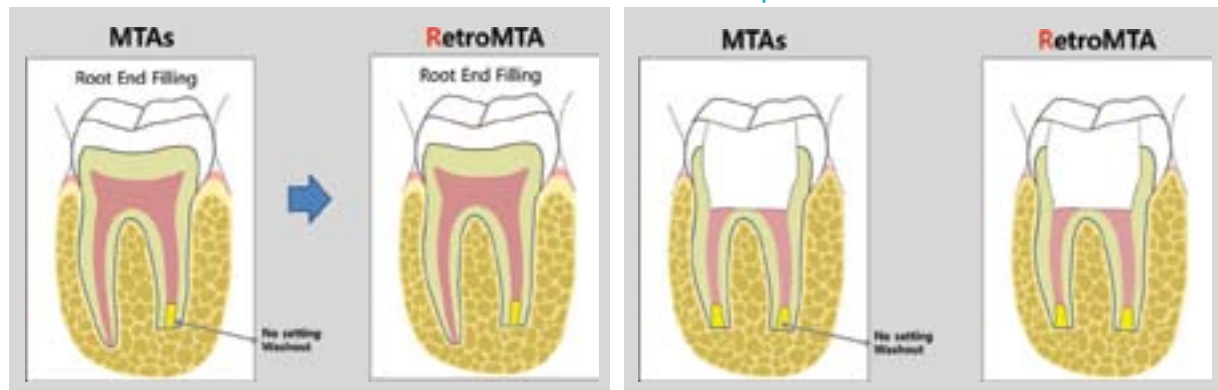
**Economic
Price**

MTAs vs RetroMTA

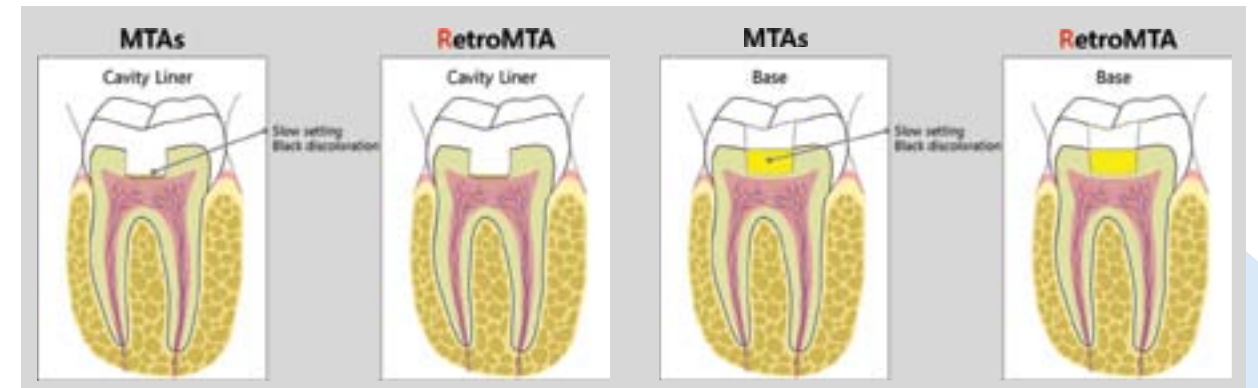
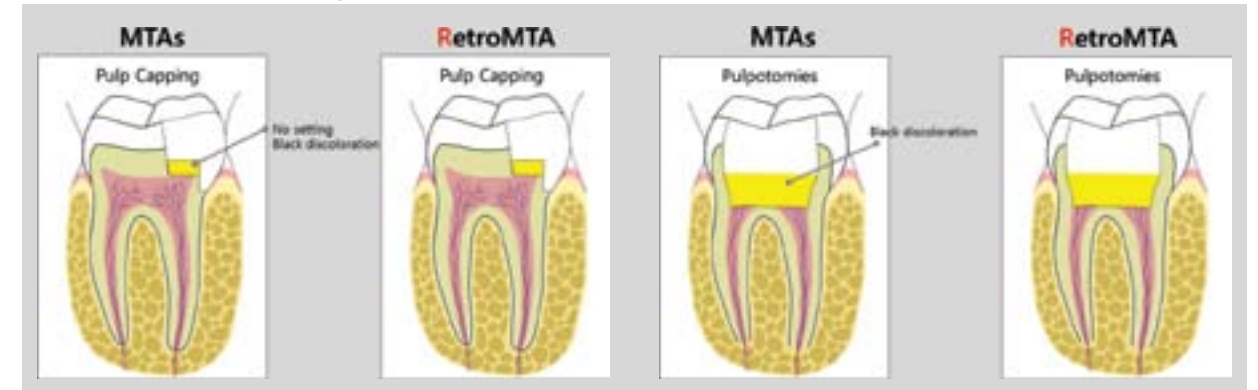
Root canal repair



Root replantation



Vital pulp therapy



Mixing Instructions

1. Open the RetroMTA cap.
 2. Cut off the end portion of powder pouch and plastic pipette with scissors.
 3. Pour 0.3 g of powder and make 3 drops of liquid on the floor of the cap.
 4. Wet it gently with a plastic spatula for 40 seconds. (DO NOT MIX)
 5. Wait until the shiny surface disappears.
 6. Load it on the carrier and apply it on the procedure area.
- * If too watery, use dry cotton pellet on the procedure area with gentle pressure approximately 120 seconds.
- * If too powdery, use wet cotton pellet on the procedure area with gentle pressure approximately 120 seconds.



RetroMTA®



1. Open the RetroMTA cap and cut off the pouch and pipette.



2. Make 3 drops of liquid and pour the 0.3 g powder into the floor of the cap.



3. Wet it gently for 40 seconds



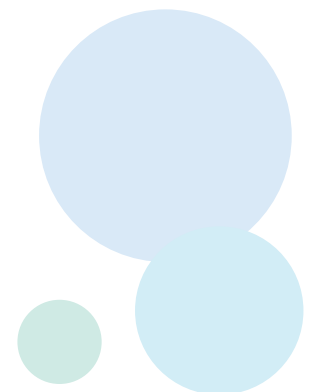
4. Wait until the shiny surface disappears



5. Load it on the carrier and apply it on the procedure area.

PACKAGE

0.3g X 8 caps / package



Physical properties

Property	RetroMTA	ProRootMTA
Specific gravity	3.106	-
Surface Area(m²/kg)	961	409
Average particle size(μm)	2.62	6.9
90% finer than(μm)	4.64	19.97
50% finer than(μm)	2.36	6.85
10% finer than(μm)	1.18	0.97
Setting time, initial	180 sec	74 min
Setting time, final	360 min	210 min

Property	RetroMTA	ProRootMTA
Particle size(μm) 1)	2.0	6.9
Content of free CaO wt.% 2)	0.66	1.74
Total crystalline phases(%) 3)	96.9	94.3
Expansion coefficient(%) 4)	0.09	0.27
Color	White	Yellow & Gray
Heavy metal	Non detected	Cr,As,Ni

1) Mastersizer (Malvern co., Ltd. Ver. 2.15)

2) KSL 5120

3) Calculated from composition measured by QX-RD (Phillips, PW1710)

4) Measured by Laser displacement sensor Micro Track 7000

Composition and Ingredient Information

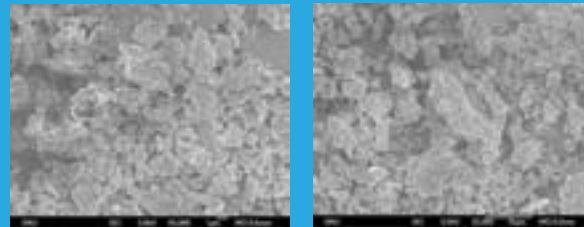
Product	Chemical Name	CAS No.	Content (wt%)
RetroMTA (OrthoMTA II)	Calcium Carbonate (CaCO ₃)	471-34-1	60~80
	Silicon Dioxide (SiO ₂)	7631-86-9	5~15
	Aluminum oxide	1344-28-1	5~10
	Calcium zirconia complex	contrast media	20~30
	Total		100

Characteristics of RetroMTA

- Rapid setting time : 150 sec
- Excellent sealing ability
- Excellent antibacterial effect
- No discoloration
- No heavy metals : No Cr, As, Ni, Bi, Fe, Cd
- Non toxic to cells : Grade 0 (cell toxicity test)
- Good radio-opacity : Al 5 mm above value

Hydraulic calcium zirconia

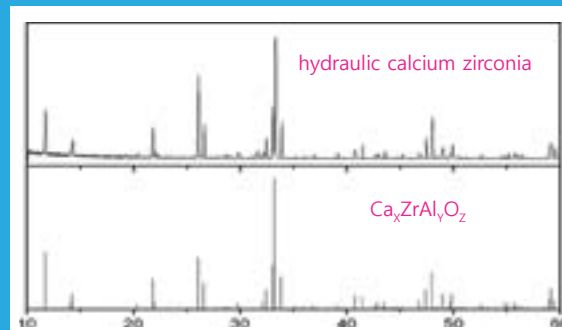
SEM



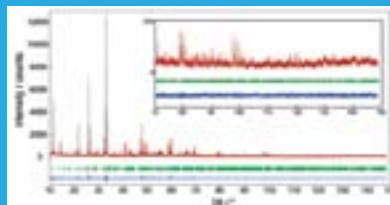
Before hydration

After hydration

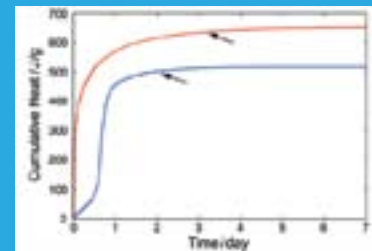
XRD analysis



Heat hydration



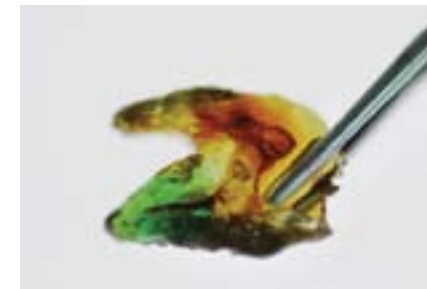
XRD analysis



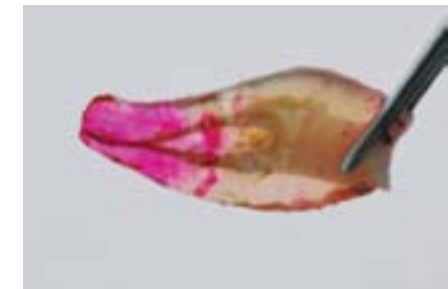
Heat hydration

Sealability

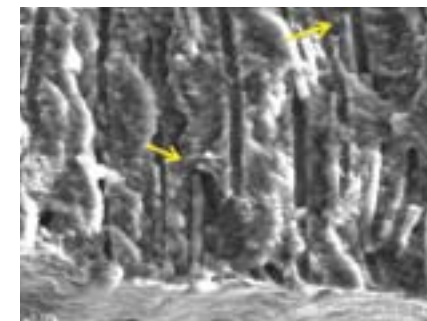
Material & Methods : immersion 12 hr before chemical setting



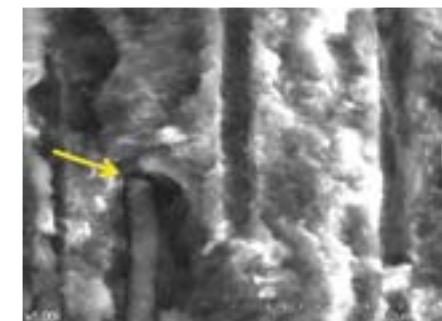
Result : No leakage



Sealability : infiltration depth of C-S-H.
100 micron into the dentinal tubules.



X2000

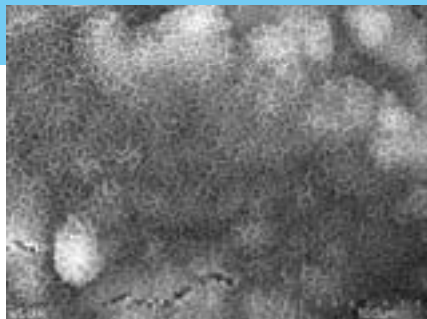


X5000

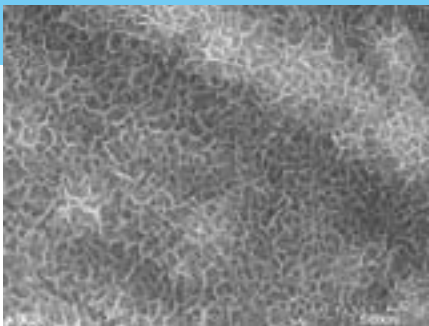
Cell toxicity (ISO 10993-5)

Material and methods	Result
• RetroMTA-OrthoMTA II (Lot No. ReT02427-1) • L-929 • RPMI 1640 (10% FBS + 1% Penicillin - streptomycin) • 3% Agar • CO2 Incubator in CO2 • Control 4 - Experimental 4	• Grade 0 - No toxic to cell

CDHA formation in PBS after 2wks

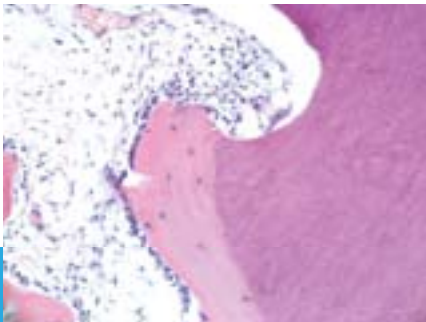
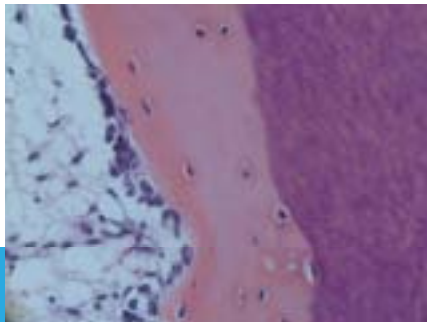


X5,000

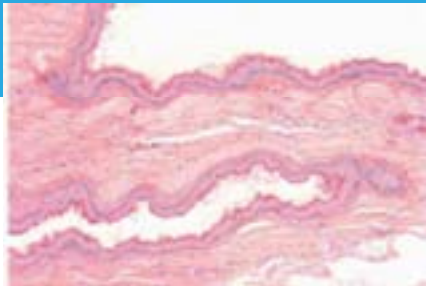
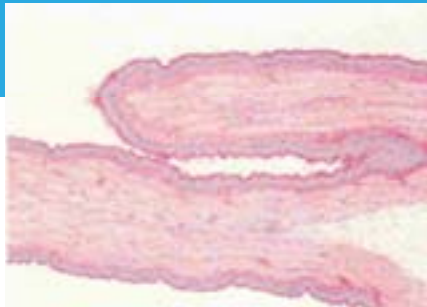


X10,000

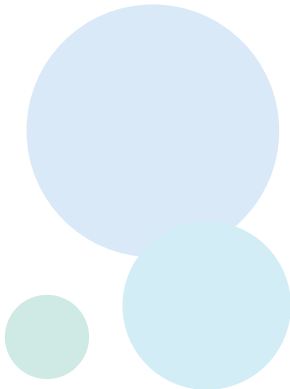
Bioactivity : in vivo



Irritability to oral mucosa



Result : No irritability
(ISO 10993-10 Annex B Oral mucosa irritation test)

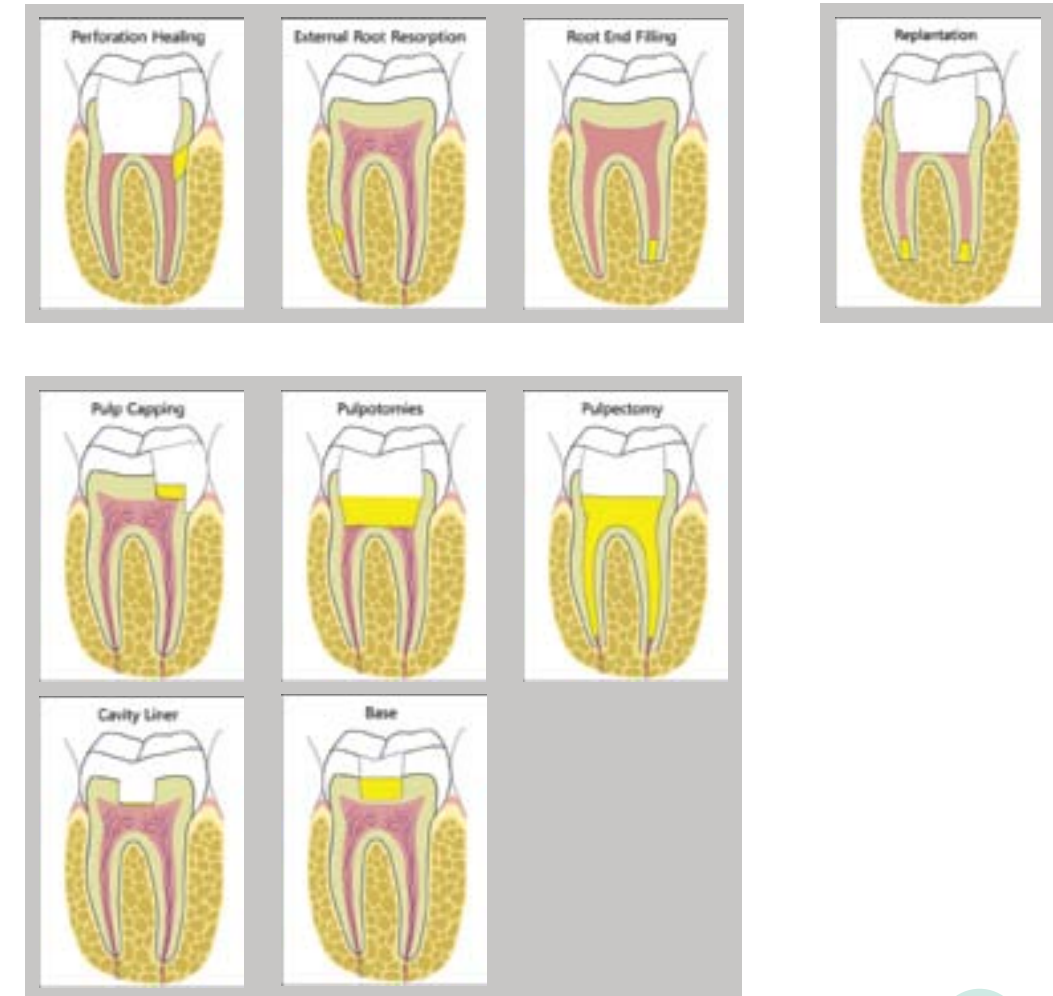


RetroMTA®



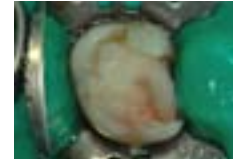
PACKAGE 0.3g X 8 caps / package

INDICATION

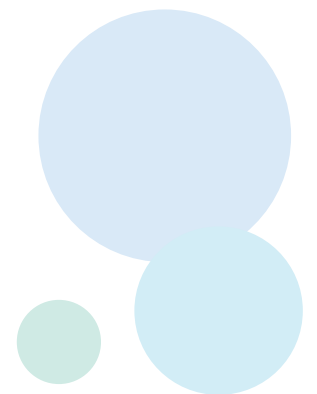


PEDIATRIC

Vital Pulpotomy



Apexogenesis



PEDIATRIC

Pulp Capping



Apexification



2010. 01

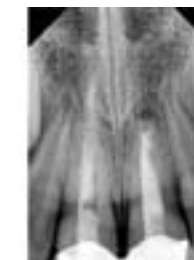
2010. 02



crown fracture



RetroMTA grafting



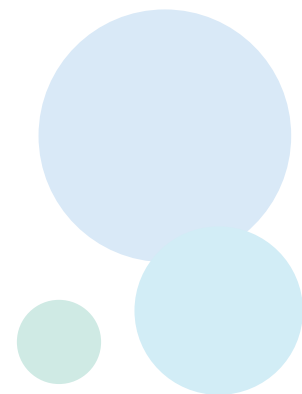
12ms F/U



2009. 01



2009. 07



Endodontic

Perforation



2009. 4. 27



2009. 6. 5



2009. 12. 21



26y, female, #46
2010. 10. 28 CF
2010. 11. 11 CR SET



50y, male, #36
2010. 10. 27 CF
2010. 11. 8 CR SET



25y, male, #36
2010. 2. 17 CF
2010. 3. 26 CR SET

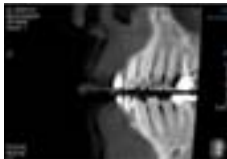
Apicoectomy



Pre op.



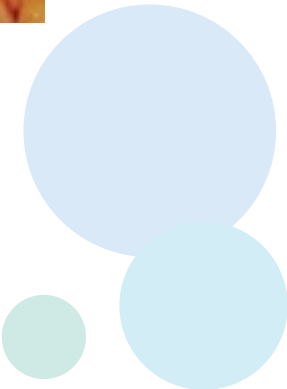
Post op.



Pre op.

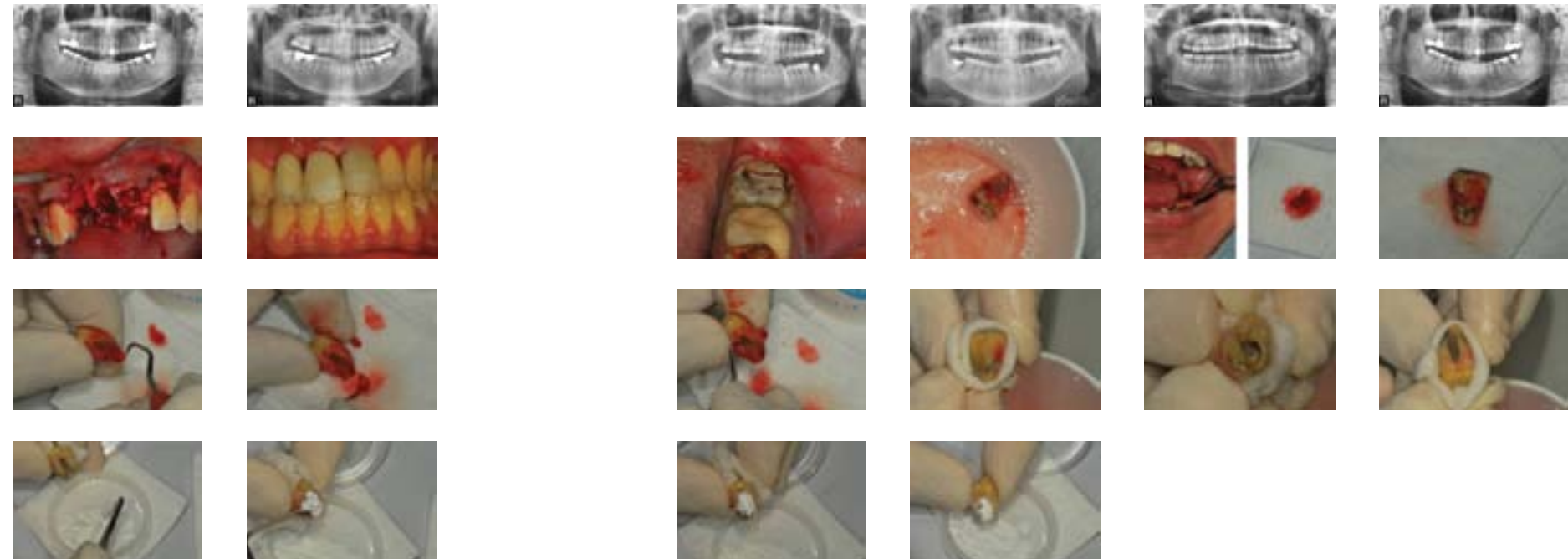


Post op.



Endodontic

Replantation

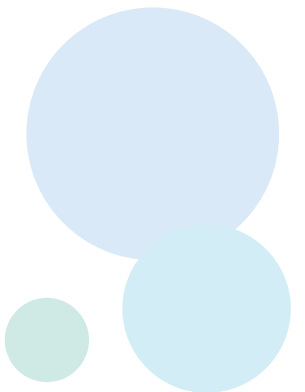


Root Resorption



2010. 9.

2010. 10.



Esthetic

Treatment of
discoloration



Discoloration with other MTA



No discoloration with RetroMTA



OrthoMTA
Guttapercha
Discoloration
with other MTA

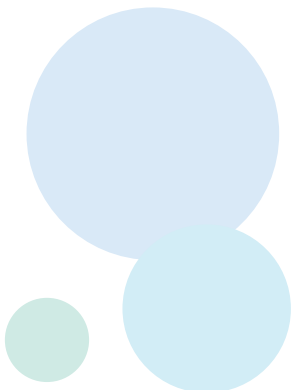


OrthoMTA
Guttapercha
No discoloration
with RetroMTA

Prevention of
discoloration



No Black of
discoloration



RESEARCH & DEVELOPMENT

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