

Simple · Smart · Safe

ENDOSEAL MTA

MINERAL TRIOXIDE AGGREGATE

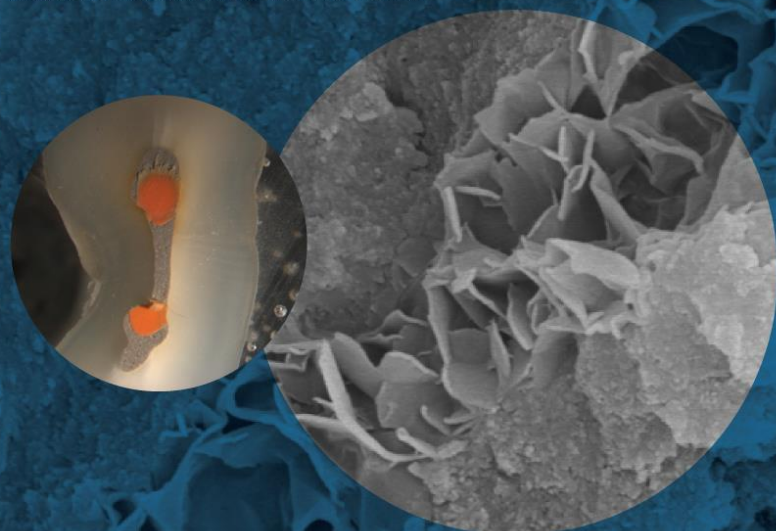
Root Canal Filling Material

PREMIXED INJECTABLE PASTE

Intratubular Biomineralization

following root canal obturation with GP+Endoseal MTA

SEM Image (X10,000) of cross section at 5mm level from the root apex



Biocompatible



Antibacterial



Hermetic



Retrievable

Ingredients

1. N-Methyl-Pyrrolidone
2. Pozzolan cement
3. zirconium oxide
4. phyllosilicates



courtesy of Dr. Kim P.S.

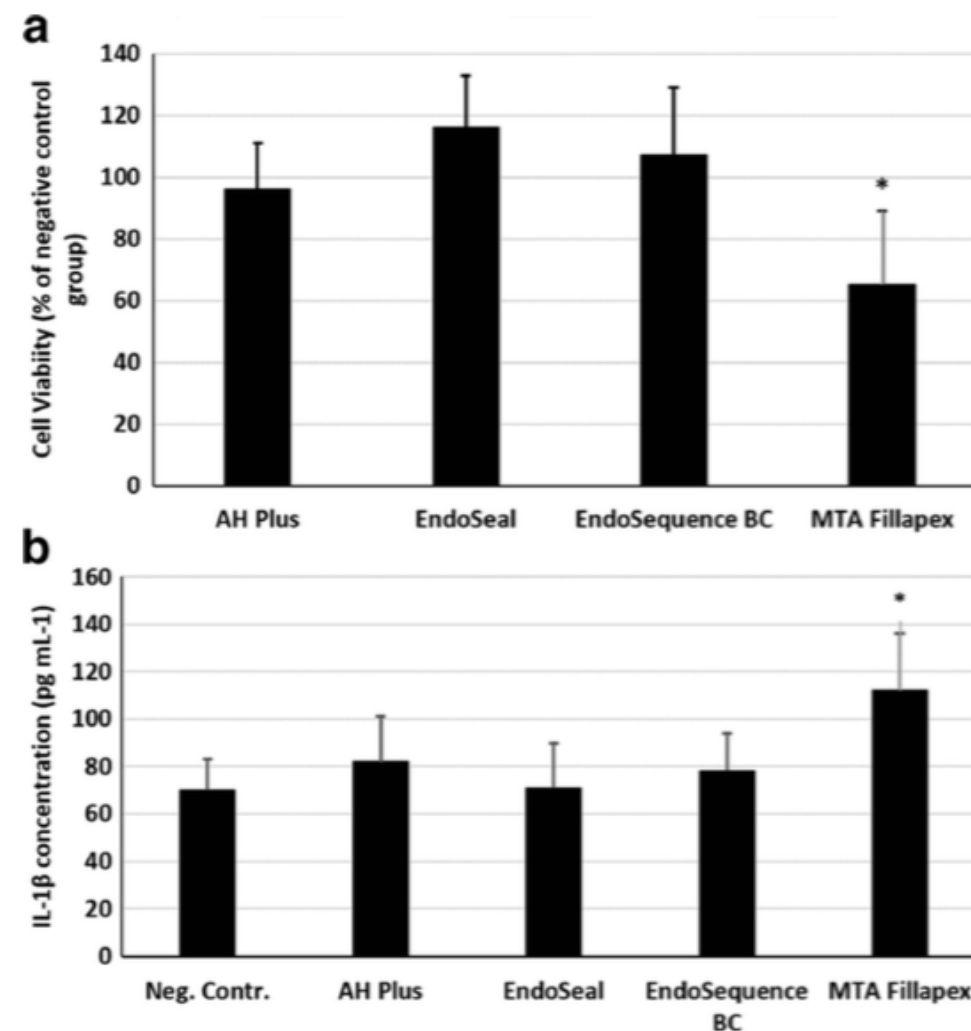
N-Methyl-Pyrrolidone

- NMP is a long-time-tested safe solvent in the medical field and is well-coordinated in biocompatibility and antibacterial properties.
- NMP reduces contact angle between sealer and Gutta-perch, sealer and root canal wall and makes them more closely attached.
- NMP is a penetrating enhancer, it induces extensive formation of Hydroxylapatite(HA) in the dentinal tubules.

ORIGINAL ARTICLE

Cytocompatibility of calcium silicate-based sealers in a three-dimensional cell culture model

Emmanuel João Nogueira Leal da Silva^{1,2,3} · Alexandre A. Zaia⁴ · Ove A. Peters⁵



SCIENTIFIC REPORTS

OPEN

Influence of environment on testing of hydraulic sealers

Mira Kebudi Benezra¹, Pierre Schembri Wismayer² & Josette Camilleri^{3,4}

to enhance the stem cells better than the Endoseal also in contrast to the findings in the current study. Previous research on biocompatibility of Endoseal implanted in subcutaneous tissues of rats showed Endoseal to have a similar reaction to MTA and better than AH Plus²¹. This is also inferred in the current study at the cellular level. Furthermore Endoseal was shown to enhance cell activity better than MTA Fillapex²³. However the data cannot be compared to the current study since the MTA Fillapex used in the previous research may have been the bismuth-containing MTA Fillapex. Material characterization is necessary in every research work to make sure that the materials are well characterized to enable comparison to further research.

Name	Presentation	Chemical composition	
		Component 1	Component 2
AH Plus	Two tubes	Diepoxide, calcium tungstate, zirconium oxide, aerosil, pigment	1-adamantane amine N,N'-dibenzyl-5-oxa-nonandiamine-1,9 TCD-Diamine, calcium tungstate, zirconium oxide, aerosil, silicone oil
MTA Fillapex	Two tubes	Methyl salicylate, butylene glycol, colophony, calcium tungstate, silicon oxide	Mineral trioxide aggregate, silicon dioxide, titanium dioxide, pentaerythritol, rosinat, P - Toluenesulfonamide
BioRoot	Powder/liquid	Tricalcium silicate, zirconium oxide	Water, calcium chloride, water-soluble polymer
Endoseal	1 tube	Calcium silicates, calcium aluminate, calcium aluminoferrite, calcium sulphate, radiopacifier, thickening agent	/

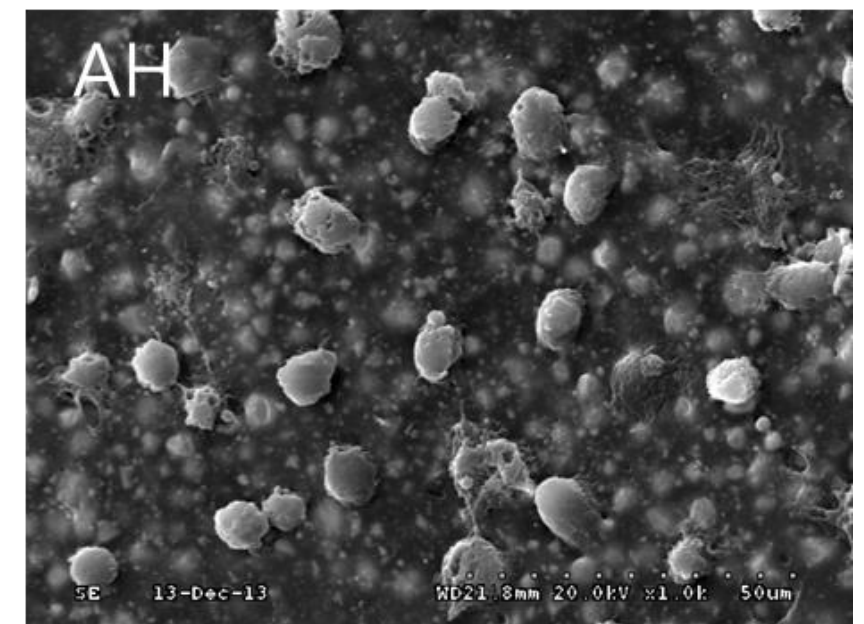
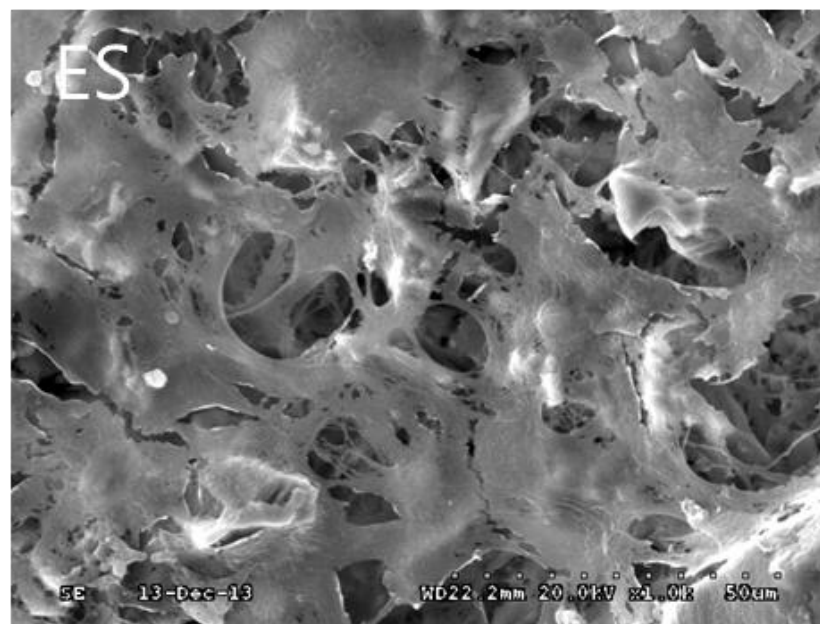
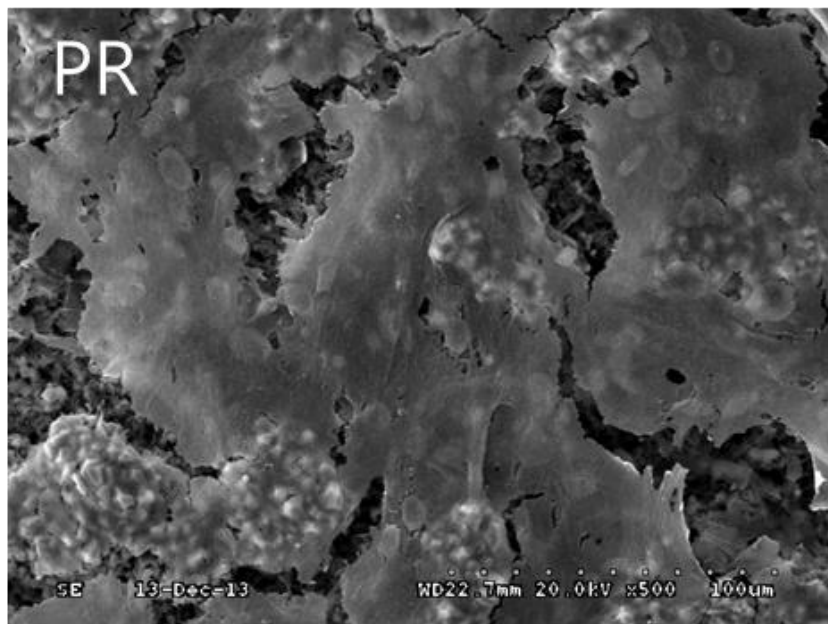
RESEARCH ARTICLE

Open Access



Physical properties and biocompatibility of an injectable calcium-silicate-based root canal sealer: *in vitro* and *in vivo* study

Eun-Su Lim^{1,2}, Young-Bae Park¹, Young-Sun Kwon¹, Won-Jun Shon^{3*}, Kwang-Won Lee^{1,2} and Kyung-San Min^{1,2*}



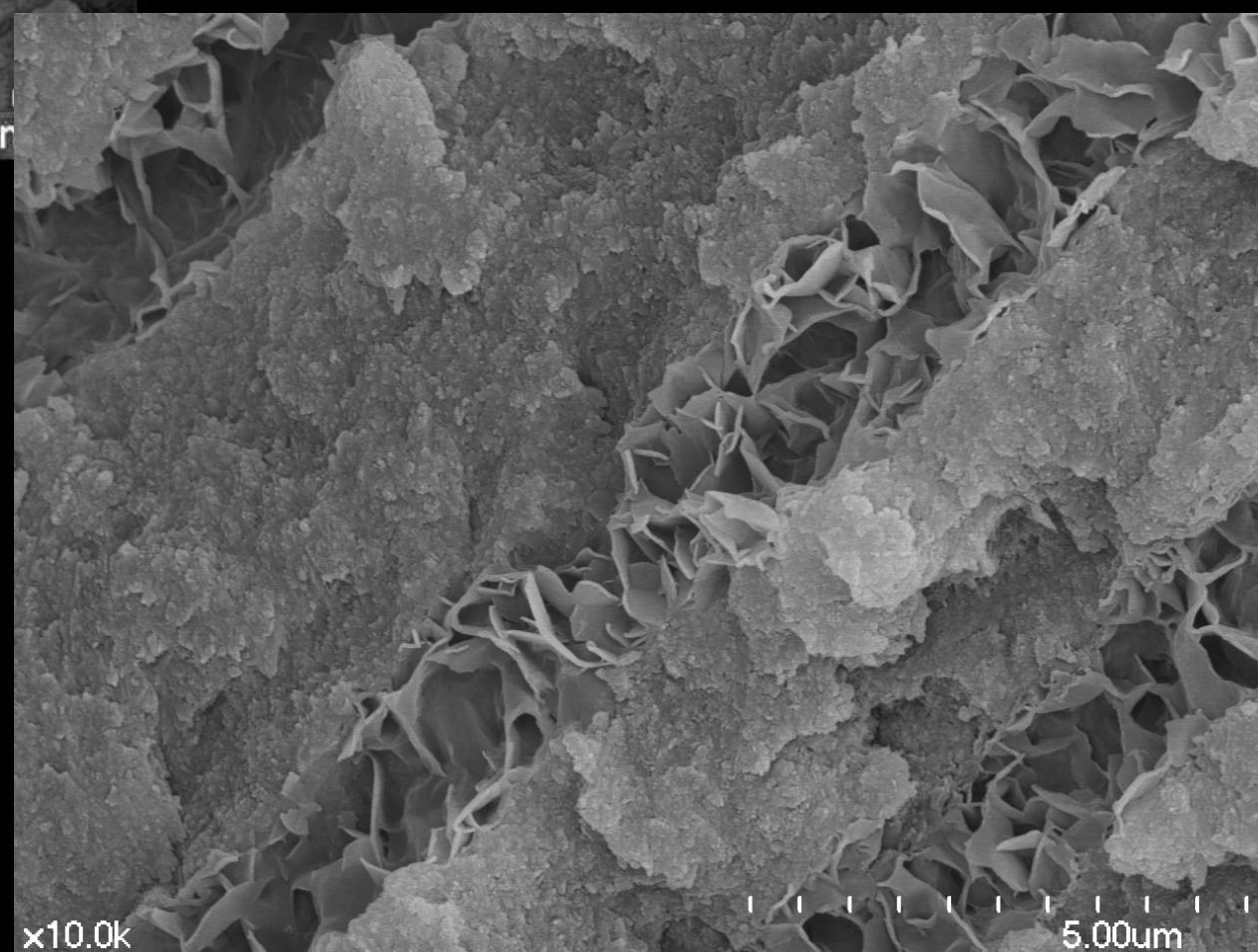
Dynamic Intratubular Biomineralization Following Root Canal Obturation With Pozzolan-Based Mineral Trioxide Aggregate Sealer Cement

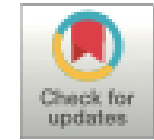
YEON-JEE YOO,¹ SEUNG-HO BAEK,¹ KEE-YEON KUM,¹ WON-JUN SHON,¹ KYUNG-MI WOO,² AND WOOCHEOL LEE¹

TABLE I Depths of material penetration into the dentinal tubules and intratubular mineralization (mean \pm standard deviation)

Root canal obturation material	GP with Pz-MTA sealer	Pz-MTA sealer only	ProRoot MTA only
Tubular penetration depth (μm)	23.77 \pm 2.48	Not detected	Not detected
Intratubular mineralization depth (μm)			
PBS pretreatment			
No	350.25 \pm 36.50 ^{Ab}	62.55 \pm 9.56 ^{Bb}	68.20 \pm 11.20 ^{Bb}
Yes	392.69 \pm 39.43 ^{Aa}	98.12 \pm 14.45 ^{Ba}	130.51 \pm 20.21 ^{Ba}

GP, gutta percha; MTA, mineral trioxide aggregate; PBS, phosphate buffered saline; Pz-MTA, pozzolan-derived mineral trioxide aggregate. Same uppercase alphabet superscripts in row show no significant differences among the mean values of experimental groups ($p > 0.05$). Same lowercase alphabet superscripts in column show no significant effect of PBS pretreatment on the mean values of intratubular mineralization within each group ($p > 0.05$).

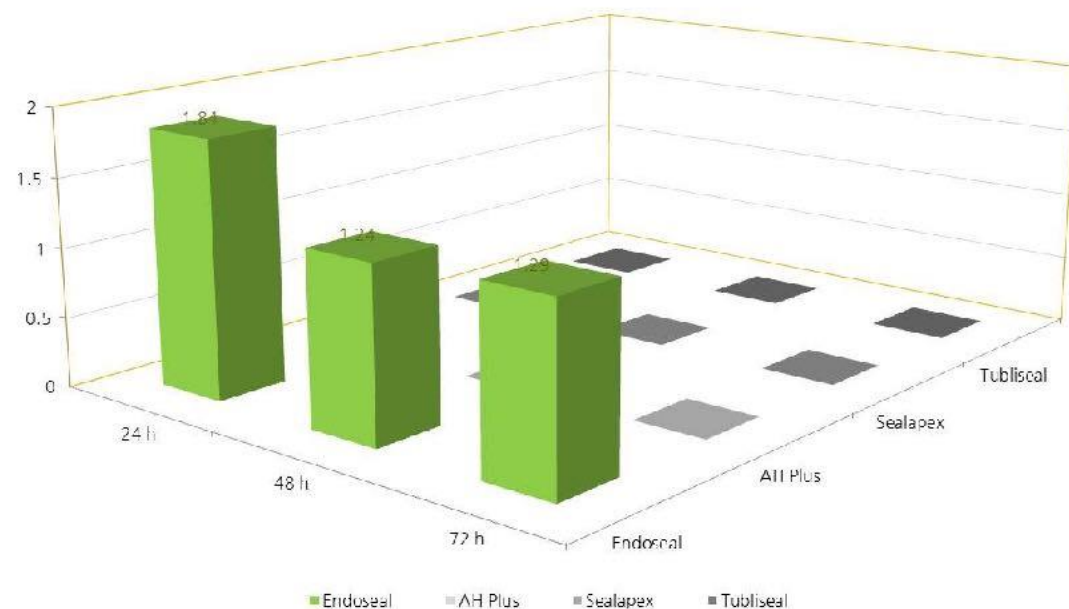




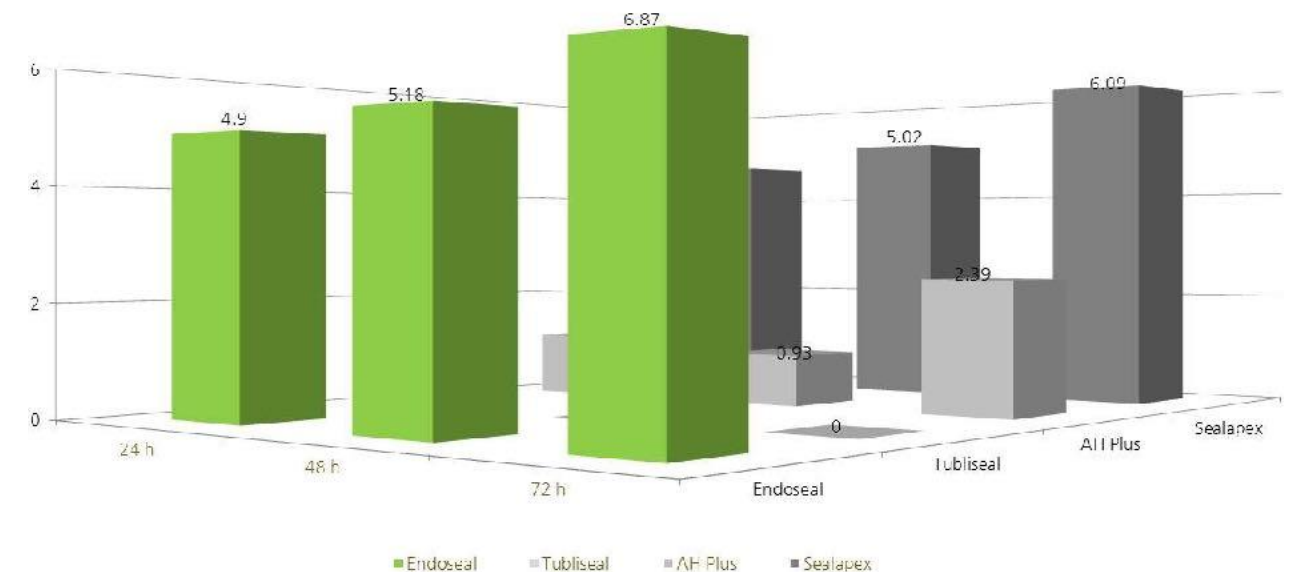
Comparison of antimicrobial activity of traditional and new developed root sealers against pathogens related root canal

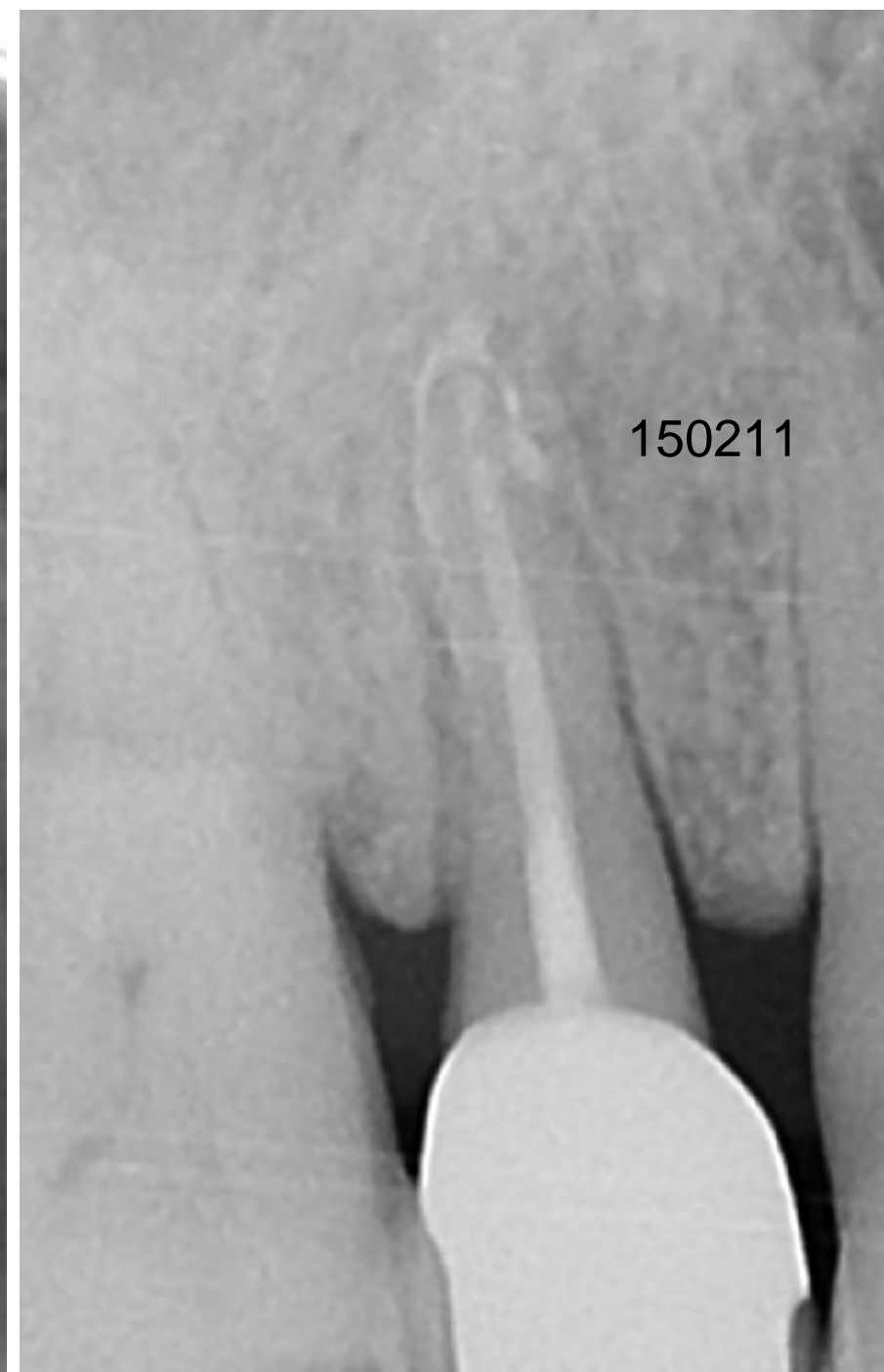
Joo-Hee Shin ^a, Dong-Yul Lee ^b, Sung-Hoon Lee ^{c*}

E.Faecalis



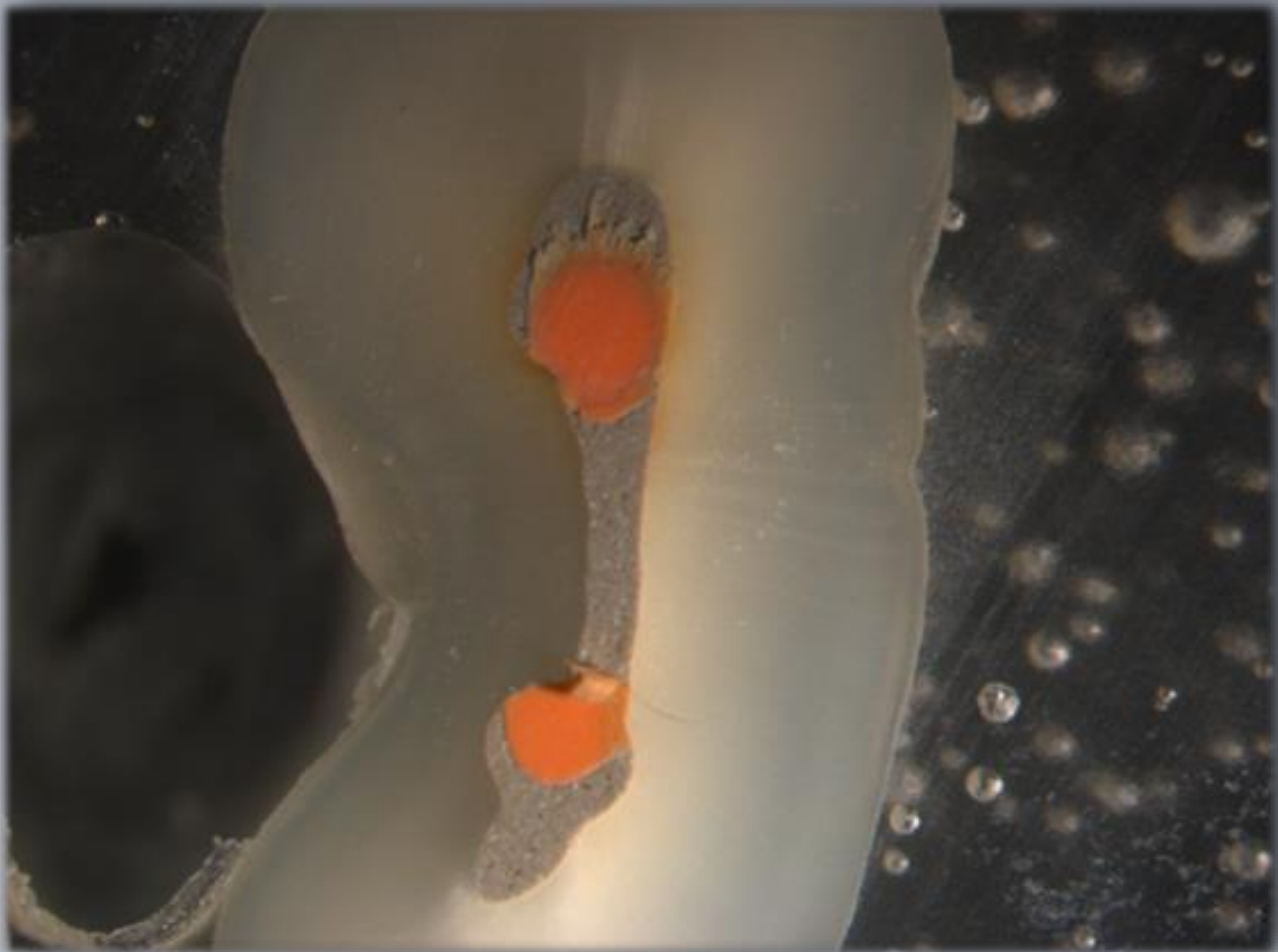
S.Mutans





Pozzolan cement

- pozzolan reaction converts the calcium hydroxide produced in the hydration process of calcium silicates into C_S_H at the interface between the root canal and the MTA
- The generated C_S_H reduce the discoloration by blocking the reaction of bismuth oxide and collagen around the dentinal tubules.
- pozzolan reaction inhibits the alkali aggregate reaction by calcium hydroxide and improves long-term stability.
- There is little root weakening by calcium hydroxide.



Courtesy of Kyung-San Min

Tooth discoloration induced by a novel mineral trioxide aggregate-based root canal sealer

Dae-Sung Lee¹, Myung-Jin Lim¹, Yoorina Choi², Vinicius Rosa³, Chan-Ui Hong⁴,
Kyung-San Min^{1,5}

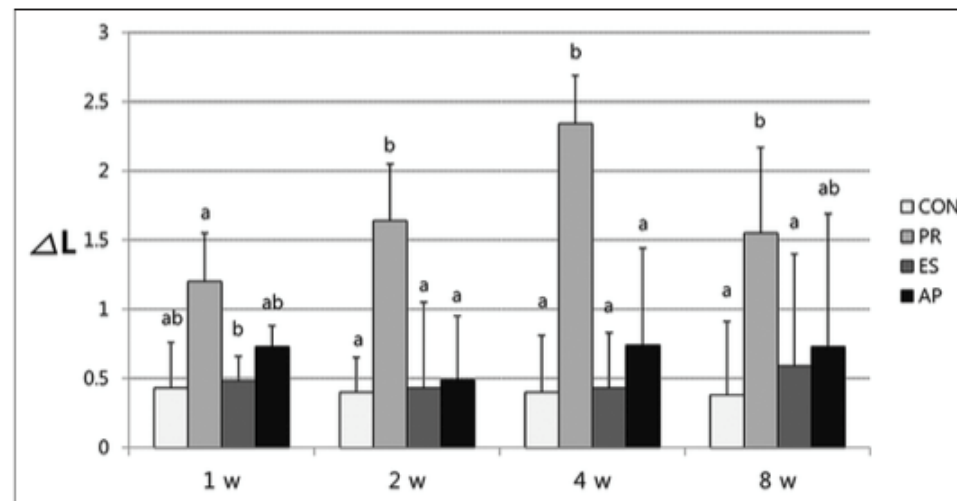


Figure 3: ΔL values (mean \pm standard deviation) for each group at five different time points. The same letters indicate no significant difference between the groups (Tukey test, $P = 0.05$). CON: Control, PR: ProRoot, ES: Endoseal, AP: AHplus

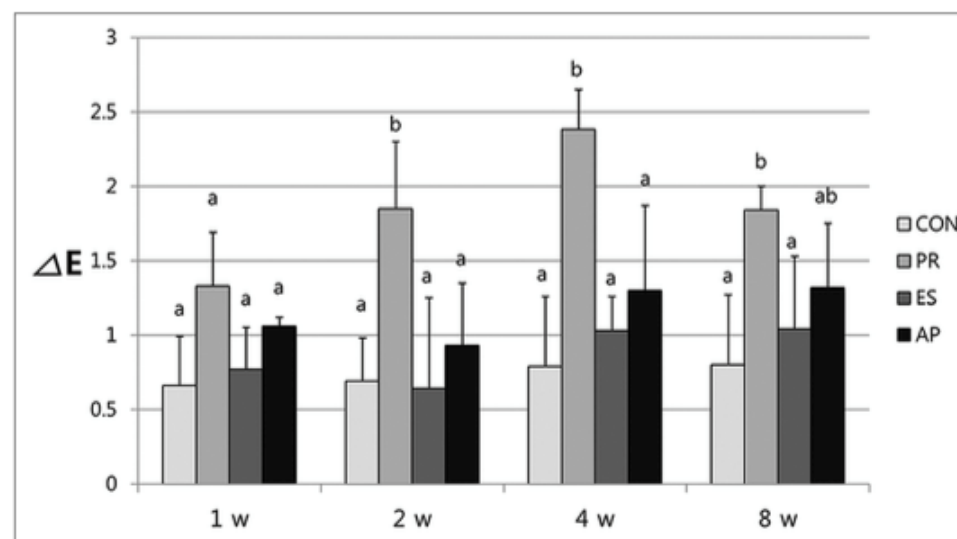
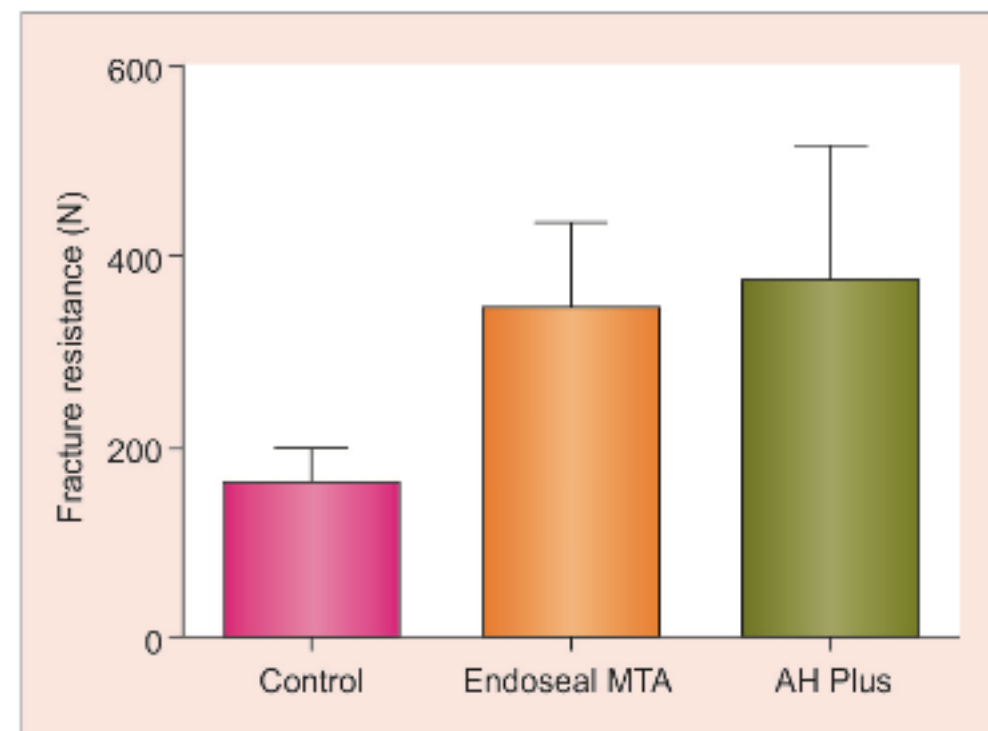


Figure 4: ΔE values (mean \pm standard deviation) for each group at five different time points. The same letters indicate no significant difference between groups (Tukey test, $P = 0.05$). CON: Control, PR: ProRoot, ES: Endoseal, AP: AHplus

Within the limitations of the present study, we conclude that a novel MTA-based root canal sealer, Endoseal, showed discoloration that is comparable to that of AHplus, and significantly lower than that with ProRoot. Although Endoseal appears to have little effect on tooth discoloration, further studies should be conducted to confirm its long-term color stability.

Comparative evaluation of Fracture Resistance of Endodontically Treated Teeth Obturated with Pozzolan-based MTA Sealer and Epoxy Resin-based Sealer: An *in vitro* Study

¹Sree Theja Upadhyay, ²Tina Puthen Purayil, ³Kishore Ginjupalli

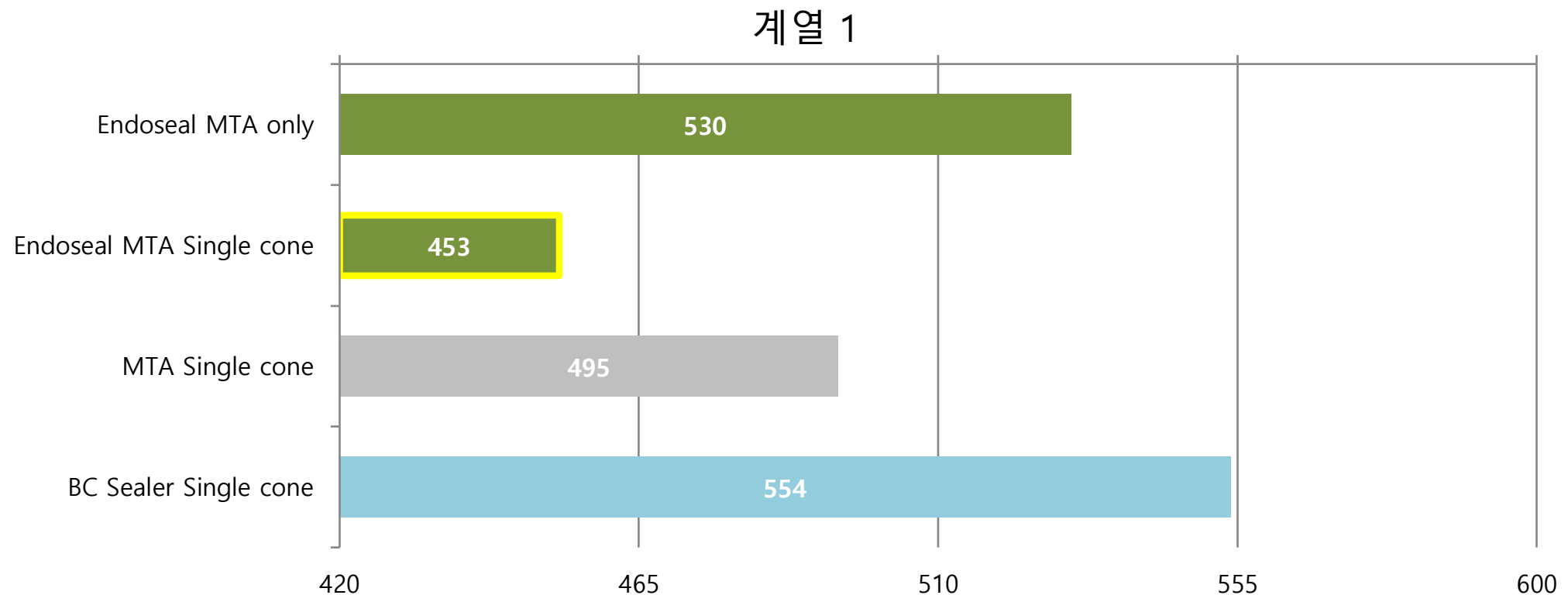


Graph 1: Mean fracture resistance and standard deviations for all the groups

Zirconium oxide

- ZrO_2 is added for the purpose of improving radiopacity and reducing the compressive strength of the MTA.
- There is no reactivity.
- It is not toxic.

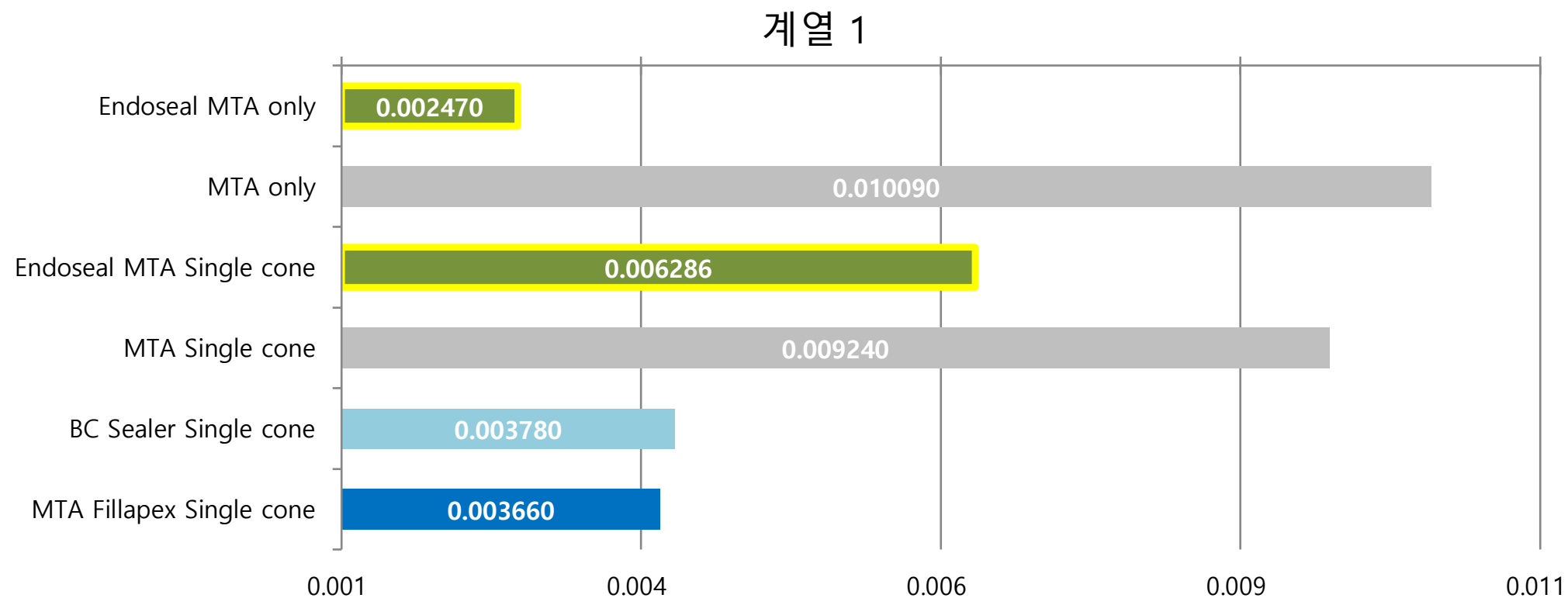
Retrievability



The root canal filling material must be retrievable.

The ENDOSEAL MTA takes less time to remove compared to other root canal filling materials

Retrievability

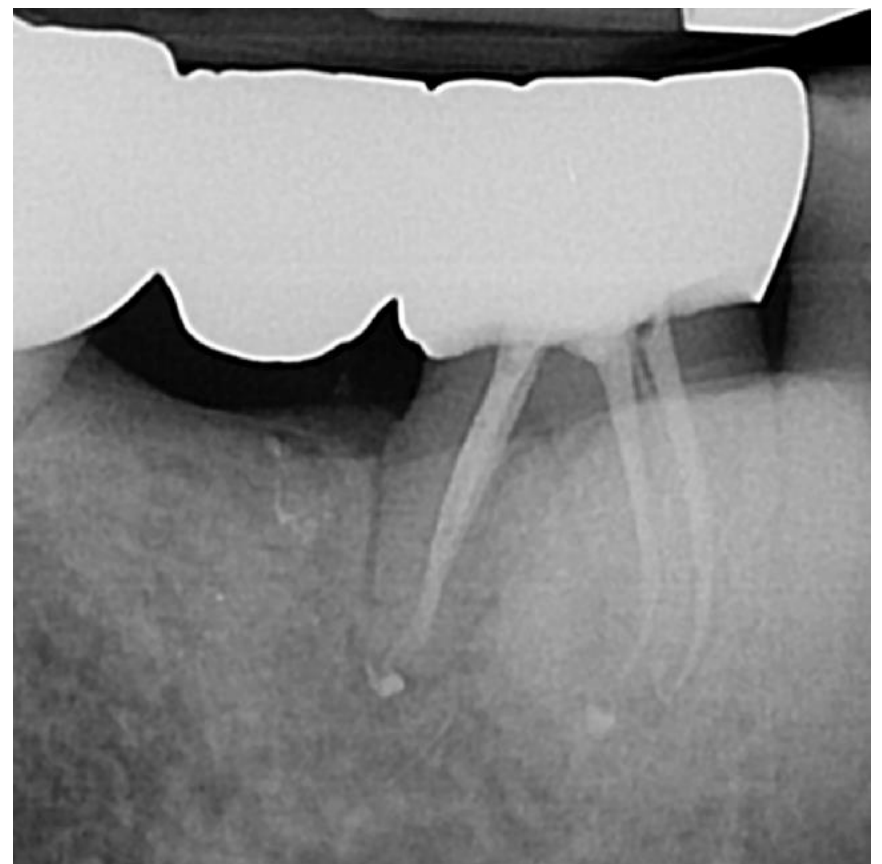


This is an experiment comparing the remaining amount after removal.

A small amount of ENDOSEAL MTA remains in the root canal even after removal.

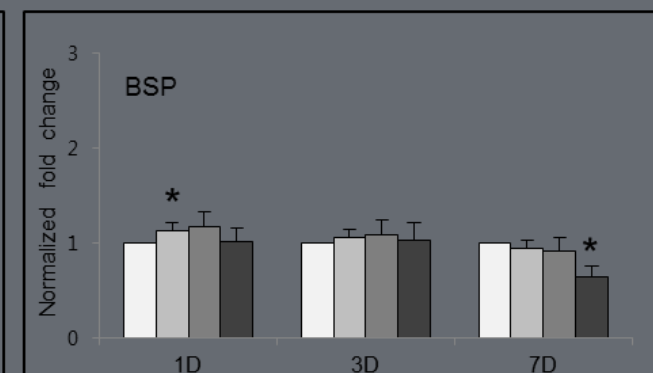
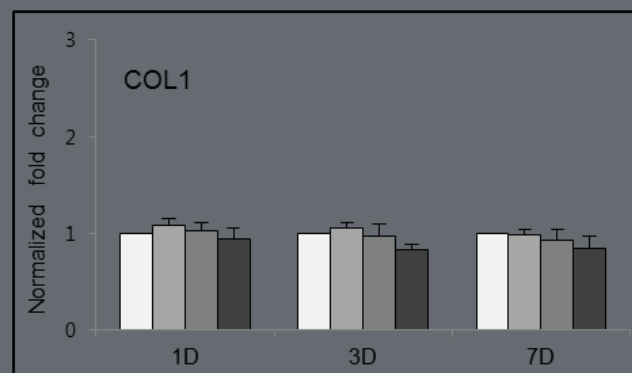
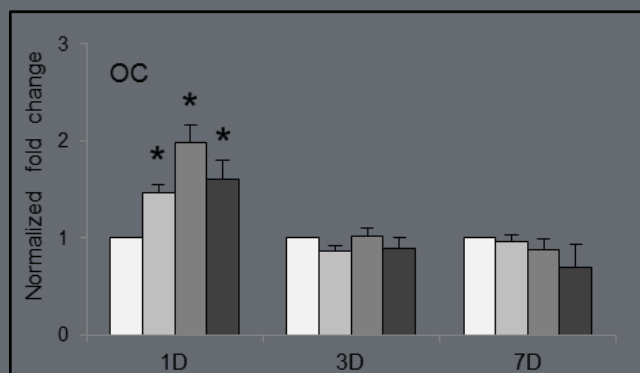
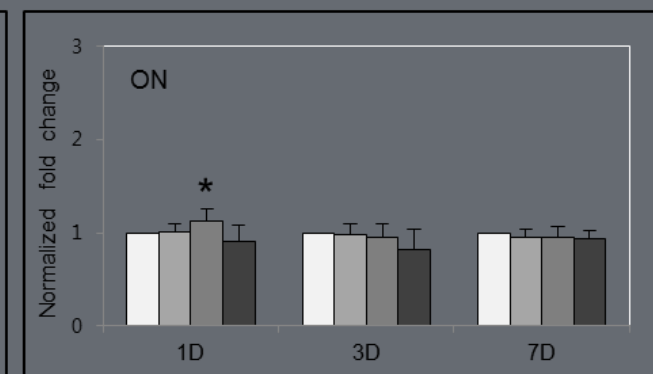
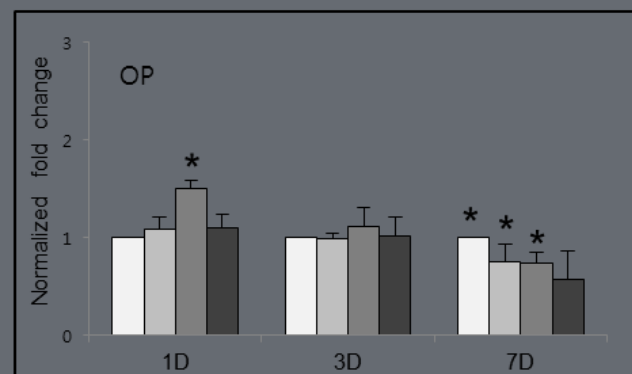
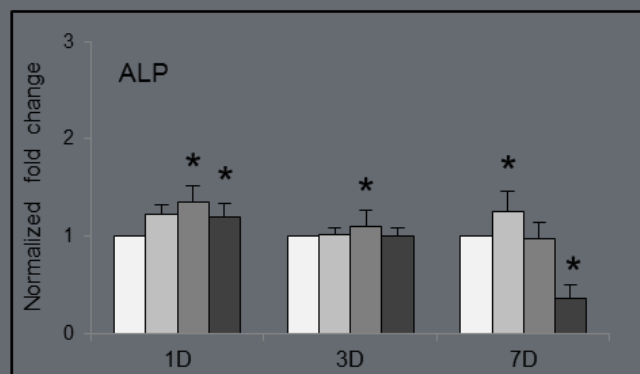
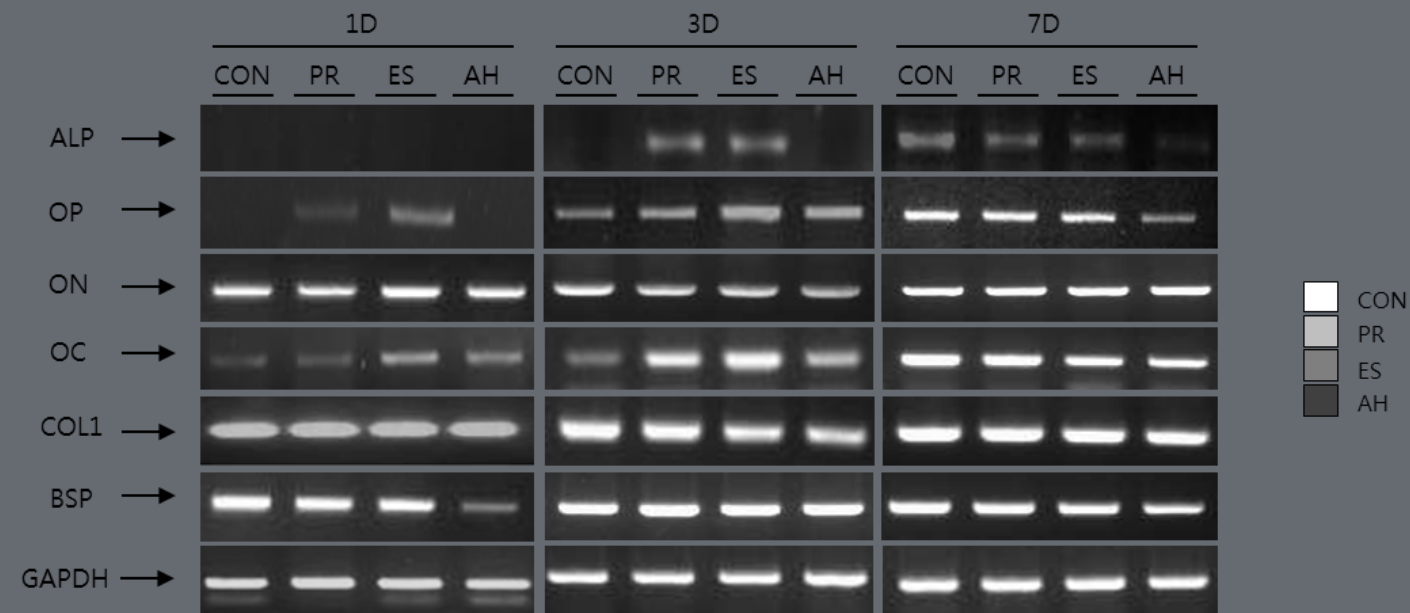
phyllosilicates

- It improves sealing ability by inducing expansion of the sealer during the setting reaction. (ENDOSEAL MTA will expand 2 % during the setting process.)
- Sheet silicate minerals help sealer flow smoothly into every corner of the root canal, such as the accessory root canal.



3 yrs follow up data

Hard tissue formation





courtesy of Dr. Kim P.S.

Physical Properties of EndosealMTA



	Endoseal MTA	BC sealer	MTA Fillapex	AH plus
Flow(mm)	34.13	18.45	20.21	21.86
Film thickness(μm)	15	22 \pm 4.58	23.92 \pm 7.05	16.07 \pm 4.5
Setting time(h)	12.31	?	?	11.5 \pm 1.5
Solubility(%)	0.7	2.9 \pm 0.5	1.10 \pm 0.15	0.06 \pm 0.04
Radiopacity(mm Al)	9.50	6.68	3.01	10.00

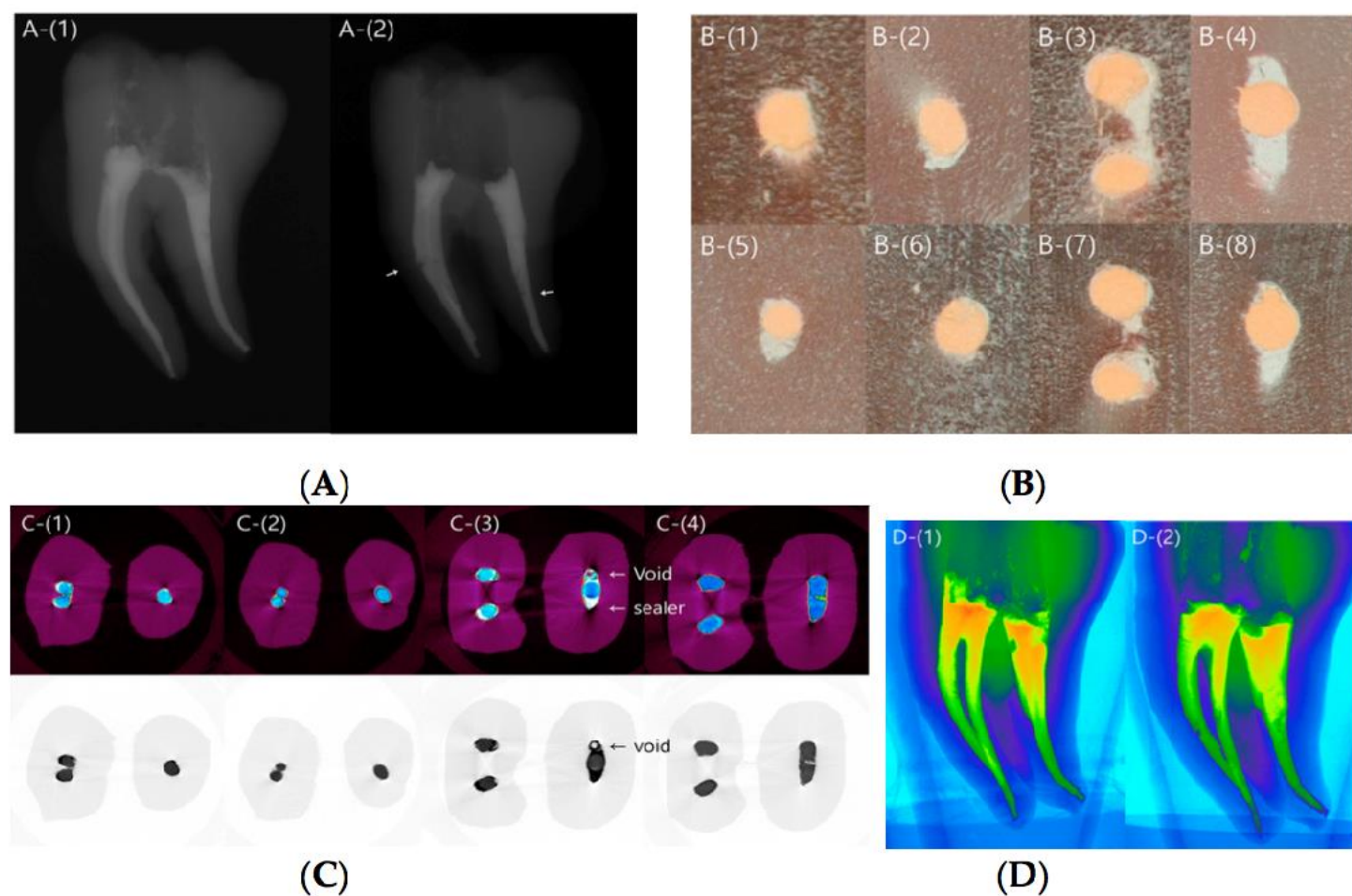
Recommended filling technique



Article

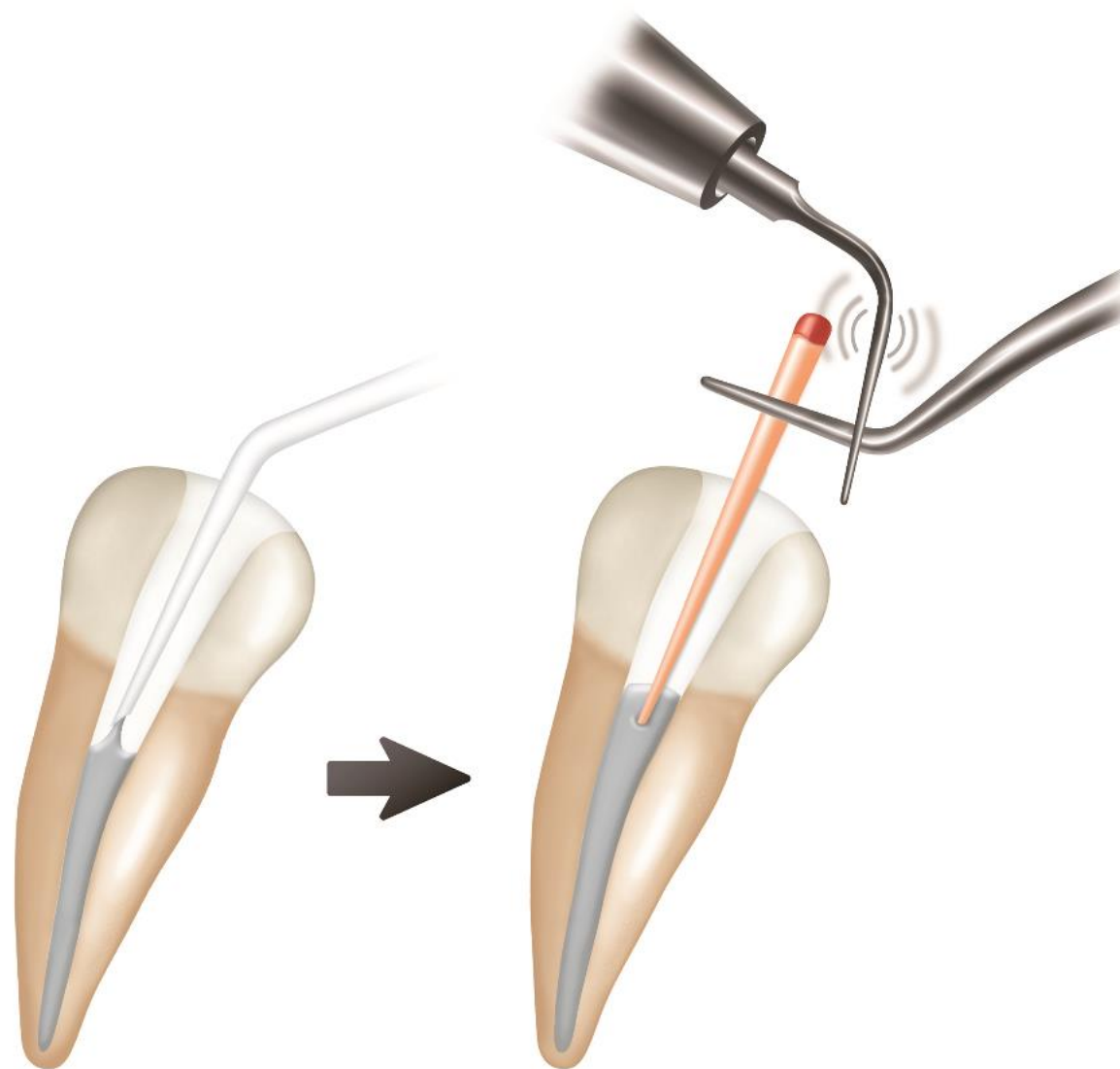
Comparison of the Percentage of Voids in the Canal Filling of a Calcium Silicate-Based Sealer and Gutta Percha Cones Using Two Obturation Techniques

Sohee Kim ¹, Sunil Kim ², Jeong-Won Park ³ , Il-Young Jung ² and Su-Jung Shin ^{3,*} 



Root Canal Filling Quality of a Premixed Calcium Silicate Endodontic Sealer Applied Using Gutta-percha Cone-mediated Ultrasonic Activation.

Kim JA¹, Hwang YC², Rosa V³, Yu MK¹, Lee KW¹, Min KS⁴.



Recommended syringe tip

- 24-gauge metal tips are recommended. It is safe because the ENDOSEAL MTA is not likely to be injected over the root apex.
- In case of deciduous teeth, use a plastic tip to fill the root canal .
- If there is an obstruction like a separate file in the root canal, insert the plastic tip up to the immediate upper part of the obstruction and fill it with strong pressure.



유치에서는 플라스틱 팁을 써야 치근단까지 잘 적용할수 있다.

메탈팁은 근단부까지 넣기 힘들다.

In the deciduous teeth, a plastic tip can be used to apply to the root apex.

Metal tips are difficult to get to the root apex.

Recommended tip depth

- It does not need to insert the tip deep into the root canal.
- Just slowly putting in the master cone after injecting from the middle third of the root canal, the ENDOSEAL MTA is easily filled to the root apex.
- Care should be taken when injecting with tip tightly tightened to apical third, as the endoseal MTA can overflow past the apex and into the mass.



Place the plastic tip tightly near the broken file and inject strongly until the patient is in pain.

overfilling issue

- If there is no apical stop, or if there is an apical lesion, the master cone should be pushed slowly without vibrating or pumping.
- ENDOSEAL MTA, which has passed over the root apex, does not irritate or cause lesions, but most of the time the zirconia component is not absorbed.
- If the inferior alveolar canal runs under the root apex, be careful not to go over.



7M F/U

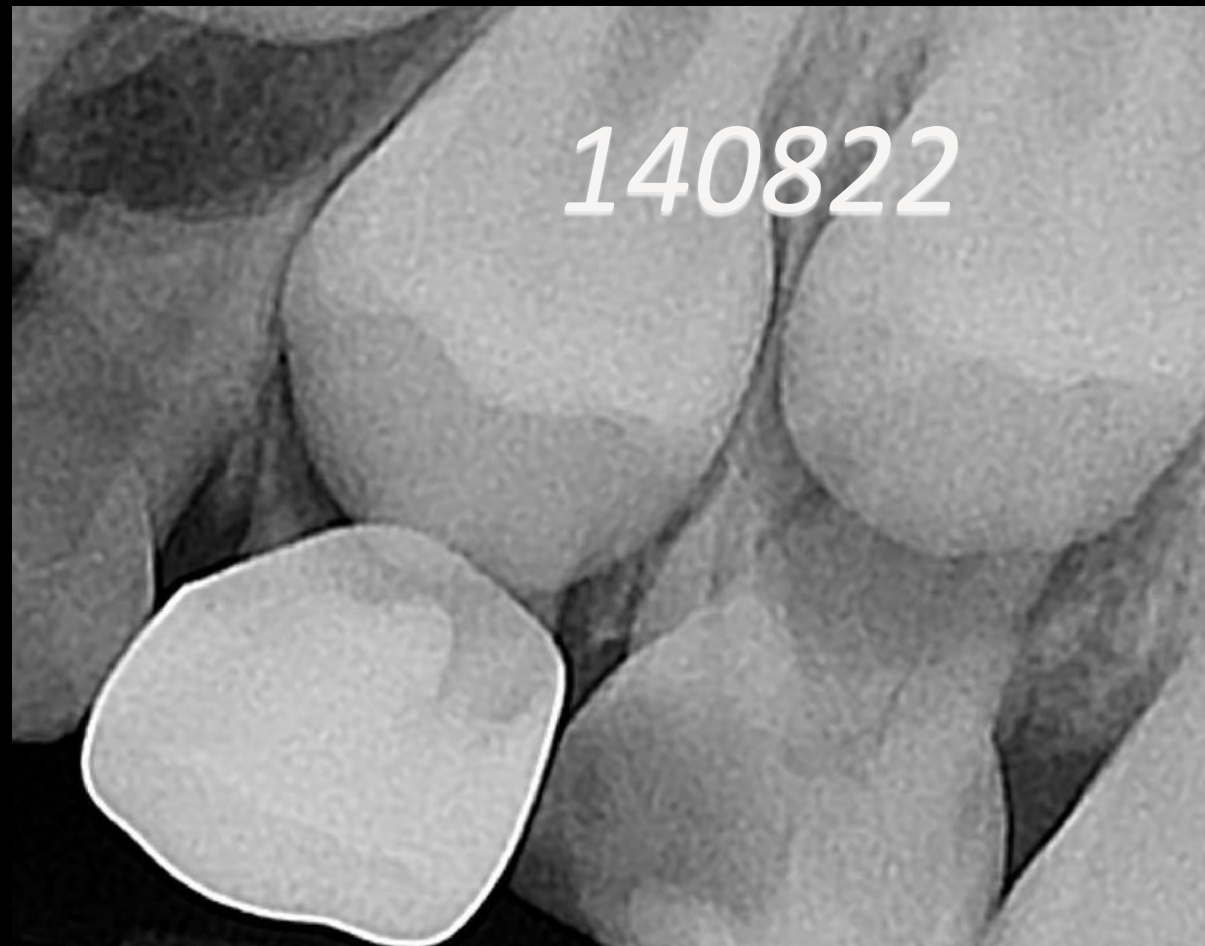
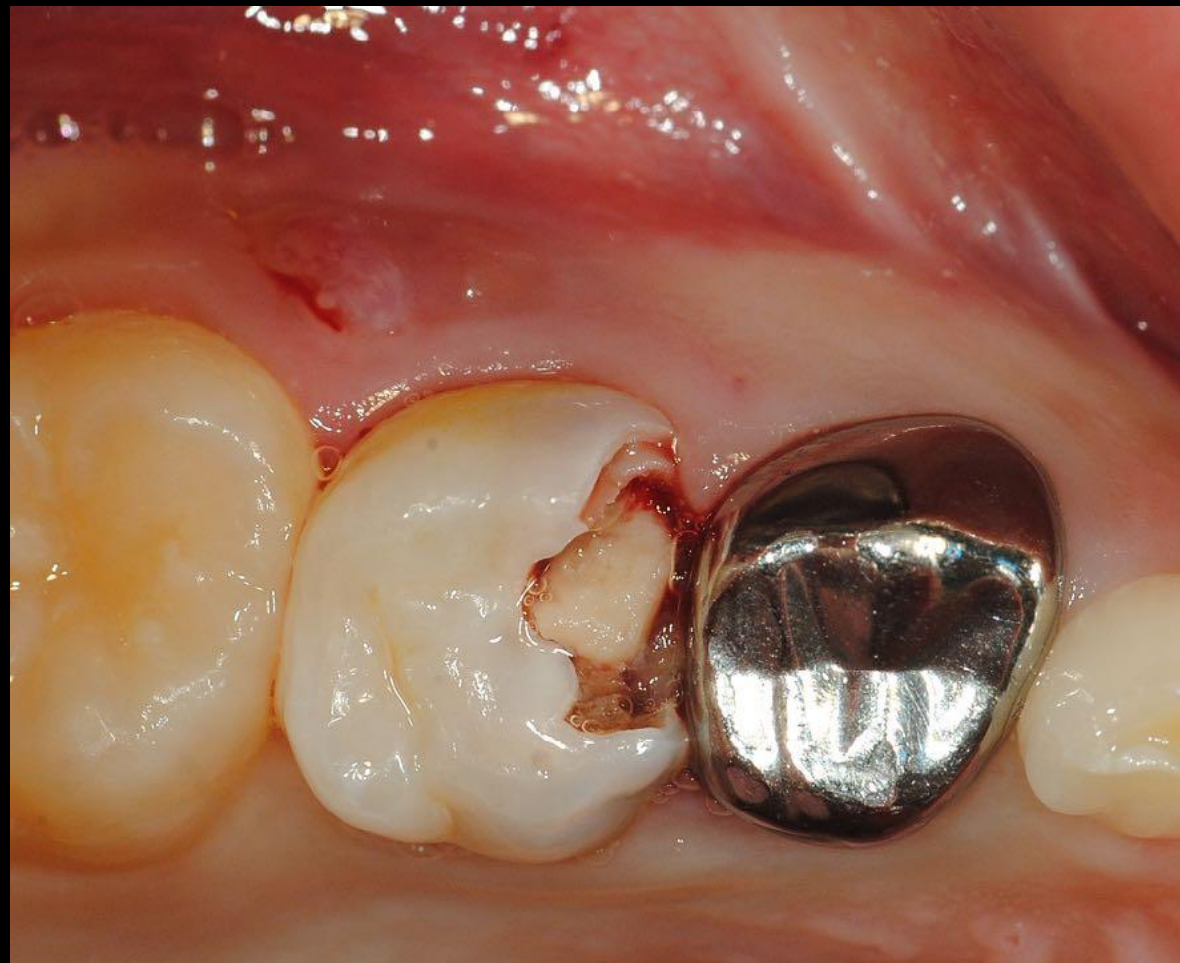
Courtesy of Kim Pyung SiK

one-day core or post

- Cut the master cone at the orifice of root canal for the one-day core, and then press the master cone with condenser to seal the orifice. Afterwards, clean chamber with water and apply conventional etching and bonding.
- For the post on the same day, cut the master cone to the desired depth using an ultrasonic tip or vertical pressure device, seal it with a GP cone and then apply conventional etching and bonding.
- If post more than one day, make it the same as usual.

Can I use Endoseal to deciduous teeth?

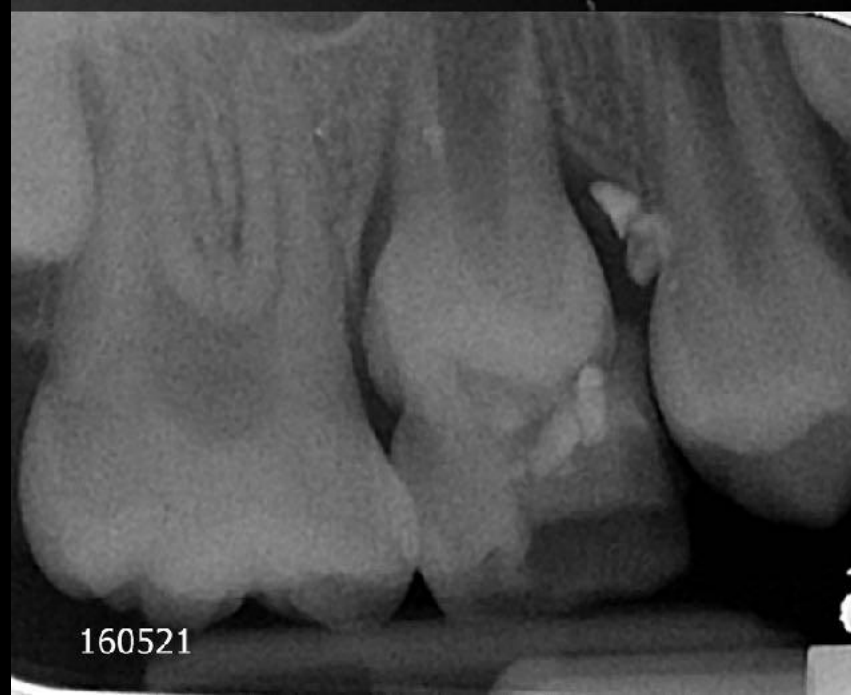
- In deciduous teeth, ENDOSEAL MTA should be used alone to absorb naturally as if it were deciduous teeth root. Never use it with the Gutta-perch.
- In root canal treatment of the deciduous teeth, applying MTA to the floor of the pulp chamber with a thickness of 2 mm or more to prevent the accessory root canal promises more predictable treatment results.
- If there is a furcal lesion, the eruption of the permanent teeth is faster than the alveolar bone regeneration.

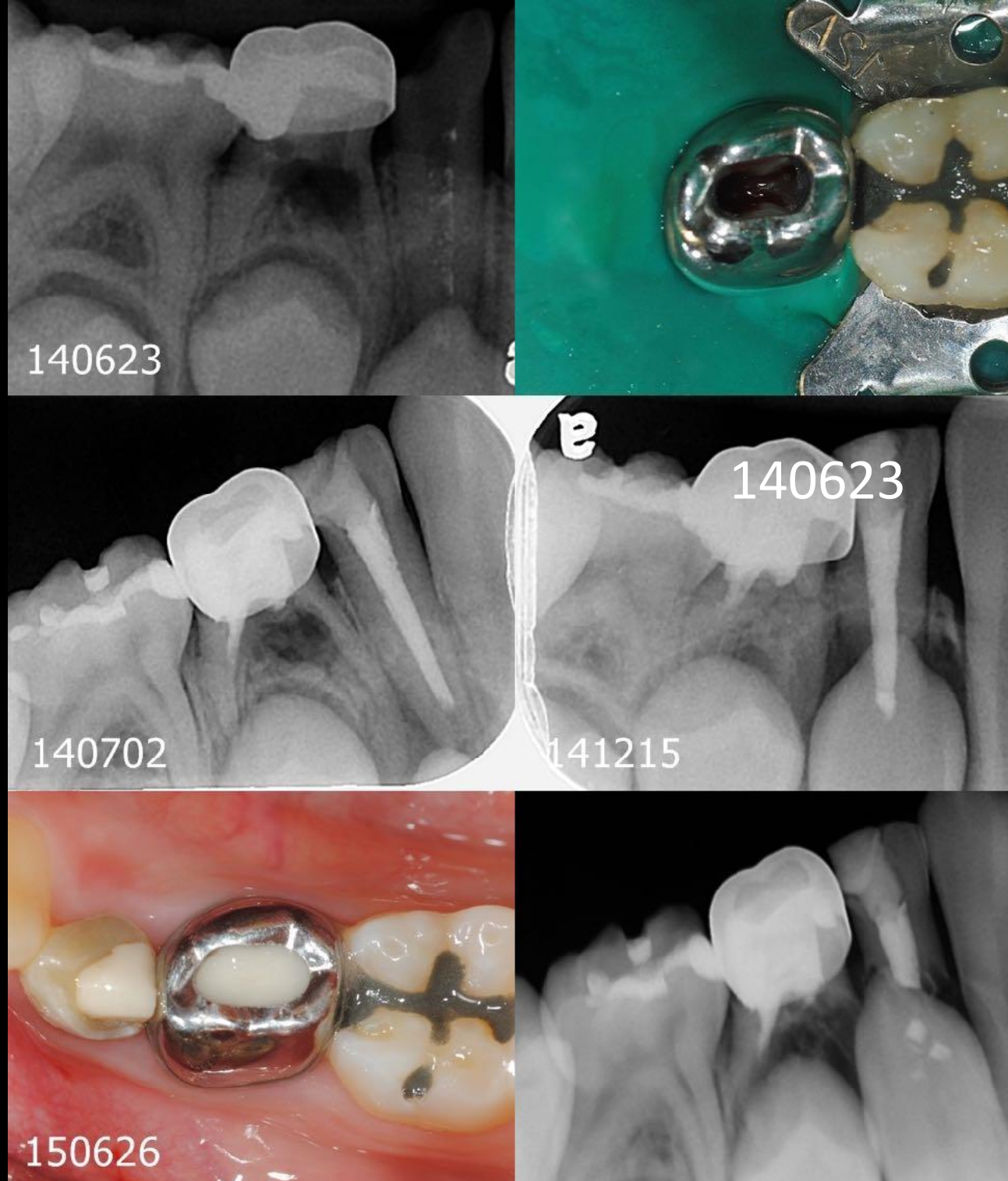




In just five months, the deciduous roots are absorbed well and the permanent tooth is erupting.

The eruption of the permanent tooth occurs rapidly in the furcal or apical lesion of the deciduous tooth. So you should explain it to the protector in advance. that's why treatment was closed without SS crown.





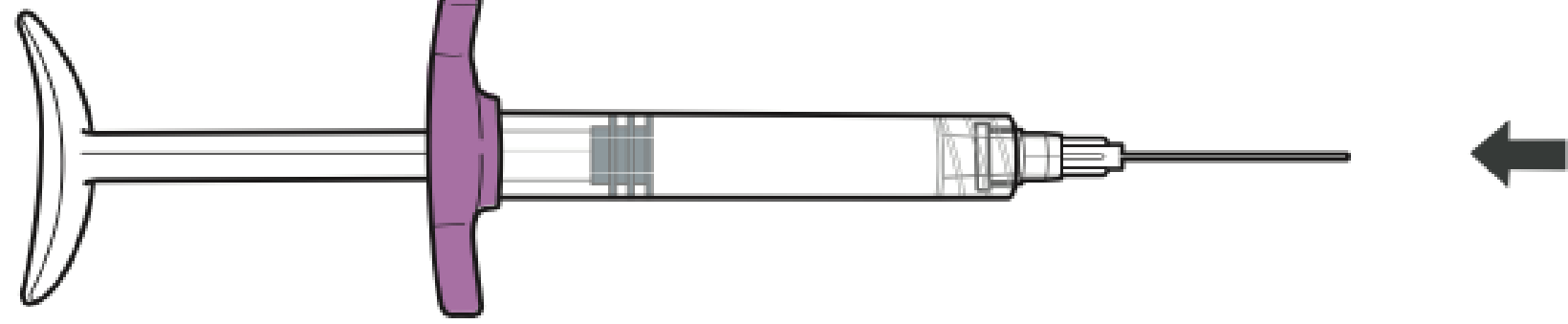
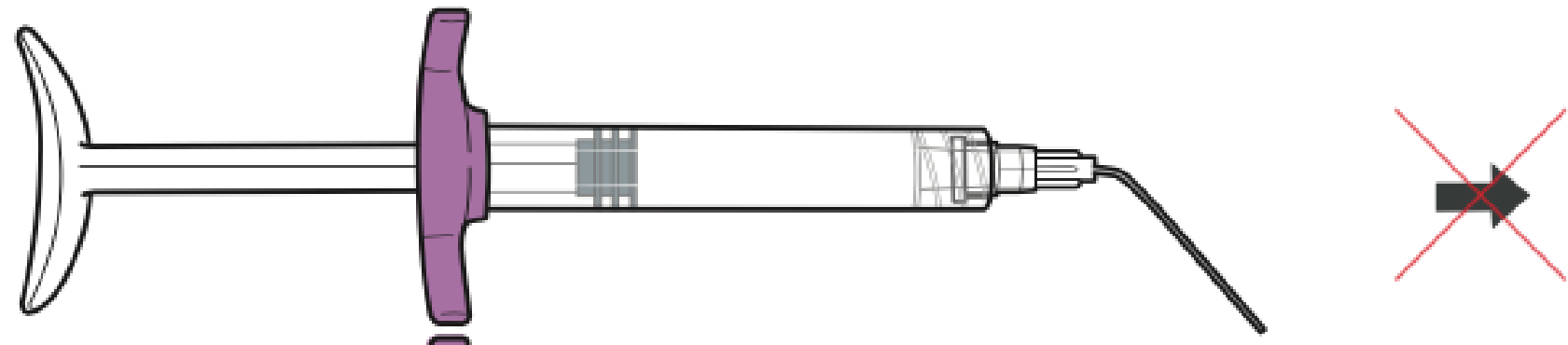
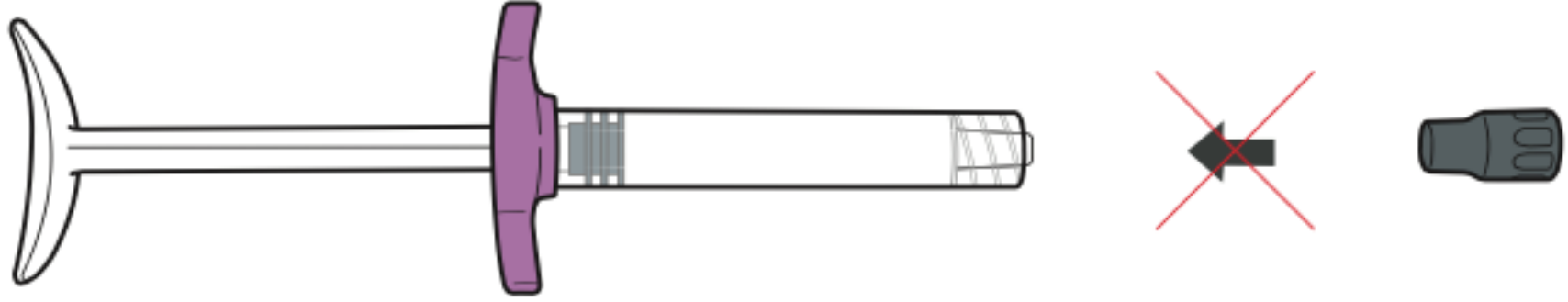
ENDOCER MTA was used at the perforated site because the setting time was fast.

Adjacent primary canine tooth was also filled with ENDORSEAL MTA.

About a year later, you can observe the natural eruption of permanent teeth and the absorption of

It was hardened in the syringe

- ENDOSEAL MTA is highly hygroscopic.
- The syringe stopper should never be re-used, and should be kept as it is when the tip is inserted and used. It is safer to keep the cap of tip fastened at this time.
- Just before use, remove the existing tip and fasten the new tip.



Thank you !!!

Maruchi development manager
and
Zahayen dental clinic director

DDS. Sungwook Jang

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