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*Theme :*  
**Revolutionizing Endorestitution in  
Global Community**

# Proceeding

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**Secretariate :**

DEPARTMENT OF CONSERVATIVE DENTISTRY  
FACULTY OF DENTISTRY AIRLANGGA UNIVERSITY  
JL. MAYJEND PROF DR MOESTOPO 47 SURABAYA 60132  
Phone : +6231 5030255 ext. 117  
E-mail : konservasiunair@yahoo.com





**Ikatan Konservasi Gigi Indonesia**

# **PROSIDING TEMU ILMIAH NASIONAL IKORGI III (TINI III)**

**Surabaya, 27 – 29 Nopember 2014**

**EDITOR:**

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## **Kata Pengantar**

Perkembangan IPTEK bidang kesehatan gigi dalam beberapa dasawarsa terakhir ini sangat cepat akibat tuntutan masyarakat yang berkembang. Selain itu, masyarakat selalu menuntut untuk mendapatkan pelayanan kesehatan gigi yang sempurna. Seorang dokter gigi saat ini tidak bisa menghindari dari persaingan yang semakin ketat, oleh karena itu harus terus menerus meningkatkan profesionalismenya, salah satunya dengan terus menerus menambah informasi ilmiah terbaru. Informasi ini selalu diperlukan demi tercapainya profesionalisme dokter gigi yang handal yang siap bersaing di pasar bebas. Pada era globalisasi saat ini, akan membuat persaingan dunia usaha yang sangat ketat dengan kompetisi yang terbuka. Hal tersebut akan membuat pelanggan (pasien) dengan mudah membanding-bandingkan kualitas pelayanan antara dokter gigi satu dengan yang lain. Oleh karena itu, secara tidak langsung akan memaksa dokter gigi untuk mengembangkan model dan strategi pelayanan yang tepat dan bermutu.

Untuk mengantisipasi hal tersebut, Ikatan Konservasi Gigi Indonesia terus berusaha untuk meningkatkan kualitas dokter gigi Indonesia khusus dalam bidang konservasi gigi dengan cara mengadakan seminar ilmiah secara berkala. Temu Ilmiah Nasional IKORGI (TINI III) ini diharapkan dapat digunakan sebagai sarana untuk alih teknologi ilmu kedokteran gigi mutakhir dalam upaya meningkatkan profesionalisme dokter gigi di era persaingan global. TINI III ini diharapkan dapat menambah pengetahuan dokter gigi sehingga dapat melahirkan dokter gigi dan dokter gigi spesialis konservasi gigi yang sukses dan mampu melayani masyarakat secara optimal serta diharapkan dapat digunakan untuk alih pengetahuan dan teknologi baik di bidang ilmu manajemen kesehatan maupun ilmu kedokteran gigi mutakhir.

Selamat mengikuti seminar, sampai jumpa di Temu Ilmiah Nasional Ikatan Konservasi Gigi Indonesia III yang akan datang.

Surabaya, 27-29 Nopember 2014

**Ari Subiyanto,drg.,SpKG(K),MKes**  
Ketua Panitia TINI III

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# MTA APPLICATION IN INTERNAL RESORPTION CASE MANAGEMENTCASE REPORT

Diana Soesilo, Fani Pangabdian

Staff Department of Endodontics, Faculty of Dentistry, Hang Tuah University  
Surabaya - Indonesia

## Abstract

**Background.** Internal resorption is an unusual condition where the dentin and pulpal walls begin to resorb centrally within the root canal. If the condition is discovered before perforation of the crown or root has occurred, root canal therapy may be carried out with the expectation of a fairly high success rate. ProRoot® MTA (Mineral Trioxide Aggregate) is used for creating an apical plug during apexification, repairing root perforations during root canal therapy and treating internal root resorption and can be used as both a root-end filling material and pulp-capping material. **Case.** A female patient, 15 years old with pulp necrosis in right upper first incisor with heavy discoloration at the tooth came to get orthodontic treatment. At radiographic view, there is radiolucency in the root canal. **Case Management.** Patient was treated with root canal therapy using MTA to fill the internal resorption in root canal. After one year examination, patient can be treated with orthodontics treatment and indicated repair at periapical bone lesion. **Conclusion.** In conclusion, MTA is an appropriate material to manage perforating internal root resorption

**Key Words :** Internal Resorption, MTA

**Correspondence:** Diana Soesilo, Staff Department of Conservative Hang Tuah University. e-mail : [dianasoesilo@yahoo.com](mailto:dianasoesilo@yahoo.com); Phone : +628165458101

## INTRODUCTION

Internal root resorption is a rare condition in permanent teeth, characterized by progressive loss of tooth substance starting from the root canal wall. Internal root resorption is usually asymptomatic, slowly progressing, and detectable upon routine radiographic examination or by the clinical sign of a —pink spot|| discoloration visible through the crown of the tooth as a result of internal root resorption in the coronal third of root canal<sup>1</sup>. Internal root resorption is a resorptive defect of the internal aspect of the root following necrosis of odontoblasts as a result of chronic inflammation. Resorption has been associated with multinucleated giant cells adjacent to a pulpal granulation tissue<sup>2</sup>. When this pathology has been diagnosed, if tooth is considered restorable and has a reasonable prognosis, endodontic treatment is the treatment of choice, and must

begin as quickly as possible to limit the progression of internal resorption<sup>3</sup>.

Selection of suitable restorative material for cases of root perforation continues to be a challenge, especially if there is extensive tooth loss. Various biomaterials have been used to seal root perforations, among them MTA has gained popularity due to its biocompatibility, potential to induce osteogenesis and cementogenesis, sealing capacity superior to that of other materials, mechanical strength, capacity to promote healing of periradicular tissue, bacterial activity, capacity for adhesion in the presence of blood, radiopacity, resistance to humidity, in addition to being well tolerated by the tissue<sup>3,4</sup>.

Mineral Trioxide Aggregate (MTA) is based on Portland cement, which primarily consists of tricalcium silicate, dicalcium silicate, tricalcium aluminate, and tetracalcium aluminoferrite. The particles of MTA are smaller than in Portland cement and bismuth oxide is added to increase radiopacity. MTA are two

types – grey and white. The white and grey MTA differs mainly in their content of iron, aluminium and magnesium oxides<sup>5</sup>. The compressive strength of MTA is about 40 Mpa after 24 hours. The sealing efficacy against penetration of bacteria in microscopes between cement and tooth substance has shown better adaptation and less leakage of MTA, compared to amalgam, IRM, and SuperEBA<sup>6</sup>.

## CASE

The patient, a 15 year old young woman was came to get an orthodontic treatment, and was consulted from Orthodontics Department to Endodontic Department. In the clinical examination, there was discolored tooth of her first right upper incisor but asymptomatic. The patient was in good health, with no significant past or present illness, but she had dental trauma history at the anterior teeth. Posterior occlusion was normal, overjet 10 mm, overbite 3 mm. The tooth did not respond to vitality test. In the radiographic exam, the presence of an oval shaped bone rarefaction was verified in the central of the root canal, which characterized internal root resorption (Fig.1).

Based on the clinical and radiographic findings the diagnosis was pulp necrosis with internal root resorption. The treatment plan was endodontic intracanal continued with orthodontic treatment (Fig 2).



**Figure 1.** Clinical examination



**Figure 2.** Radiographic examination

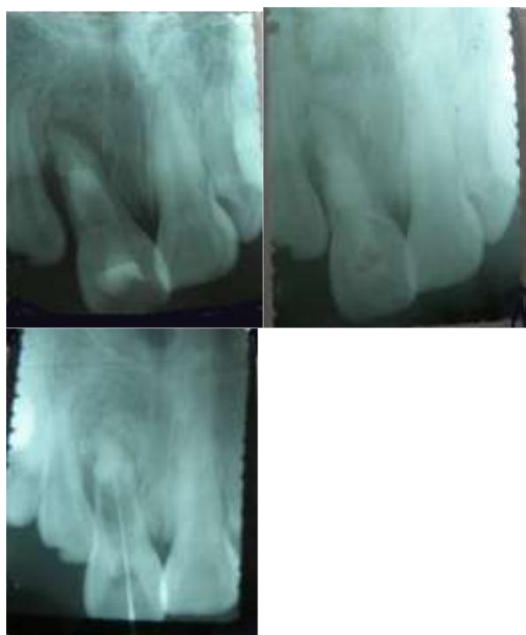
## CASE MANAGEMENT

The tooth was isolated and opened the coronal access to the root canal. Necrotic pulp tissue was removed from the canal and working length was established with Diagnostic Wire Photo (DWP), it was 21 mm (Fig 3). Irrigation with Hydrogen Peroxide ( $H_2O_2$ ) 3% and aquadest sterile. Calcium Hydroxide ( $Ca(OH)_2$ ) paste was placed in the canal to alkalinize the environment (Fig 4).

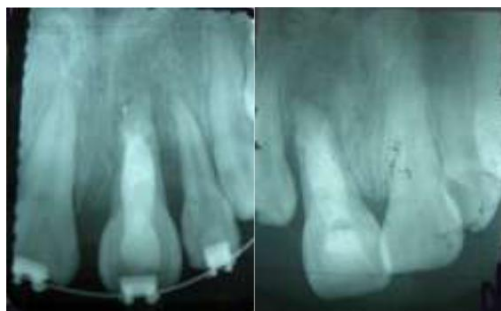
After this a new appointment was made to change the Calcium Hydroxide dressing for every 30 days, all performed with canal instrumentation, irrigation with Hydrogen Peroxide 3% and final irrigation with distilled water and dressing with Calcium Hydroxide. From radiographic examination, had seen that calcium Hydroxide paste was always been resorbed after 30 days (Fig 5).

After the period of 6 months from the beginning of treatment, and finding that the tooth was asymptomatic, without bleeding and the internal resorption radiographically stable, the internal pulp cavity was filled with white MTA (Fig 6). One month later, the patient was controlled and by the radiographic appearance the MTA didn't resorbed.

Clinical and radiographic control was continued for seven month after beginning with the clinical treatment. The patient had already got her orthodontic treatment. The tooth was shown stable, without signs and symptoms and with absence of apical rarefaction (Fig 7).



**Fig 3.** DWP; **Fig 4.** Ca(OH)<sub>2</sub> application; **Fig 5.** Ca(OH)<sub>2</sub> resorption



**Fig 6.** MTA application; **Fig 7.** Control after 7 months

## DISCUSSION

Internal inflammatory root resorption is an insidious pathological process, initiated within the pulp space and associated with loss of dentine. It is often described as oval shaped, symetrically distributed over the root canal space, and is usually asymptomatic and detecable by radiographs. When diagnosed, immediate removal of the causative agent must be considered, aiming to arrest the cellular activity responsible for the resorptive activity<sup>4,7</sup>.

The process of tooth resorption involves an elaborate interaction among inflammatory cells, resorbing cells, and hard tissue structures. However the process of tooth resorption is believed to be very similar to that bone

resorption. Injuries to and irritation of bone, dentin, and cementum lead to chemical changes within these tissues. The result is the formation of multi-nucleated giant cells, which are referred to as clasts. The clastic cell is the key cell type which is responsible for all hard tissue resorptive processes, which are accompanied by cells such as macrophages and monocytes in resorptive activities. Collectively, the cells orchestrate a complex interplay of molecular biologic events which involve cytokines, enzymes, and hormones which influence the progression of resorption<sup>8</sup>.

After the diagnosis of internal root resorption, the treatment must be started rapidly, with the objective of removing necrotic portion of the pulp. The irregularities present in root canal system, especially in internal root resorption defects, make it difficult to clean and fill the root canal. The persistence of organic rests and bacteria in these irregularities may interfere in the success of endodontic treatment in the long term<sup>3</sup>.

The use of root canal dressing with a material based on Calcium Hydroxide between sessions was aimed at dissolving remaining pulpal debris and alkalinizing the environment<sup>9</sup>. Calcium Hydroxide is antibacterial and has been shown to effectively eradicate bacteria that persist after chemo mechanical instrumentation. Calcium Hydroxide has also been shown to have synergistic effect when used in conjunction with sodium hypochlorite to remove organic debris from the root canal. Nevertheless, some case reports demonstrated the inability of Calcium Hydroxide to eliminate bacteria in ramifications because of its low solubility and inactivation by dentin, tissue fluids, and organic matter. Despite these limitations, the use of multiple Calcium Hydroxide dressings has been advocated to enhance chemo mechanical debridement of the internal root resorption defect<sup>7</sup>.

Mineral Trioxide Aggregate (MTA) is known as a biocompatible material that may induce cementum formation around the furcal perforation in animal study. The clinical applications to human subjects also have proved that MTA is good for solving the problem derived from perforation. It is not interfered the presence of moisture and inhibits the activity of bacteria. A good success rate can be achieved

with MTA usage for repair of root perforations is recommended<sup>10</sup>.

MTA seals very superiorly and no gaps were found in any of experimental specimen. By virtues of providing good seal and preventing microleakage, it can be proclaimed as antibacterial agent. MTA just like Calcium Hydroxide induces dentine bridge formation. Hard tissue bridge deposited next to MTA is because of sealing property, biocompatibility, alkalinity. Tricalcium oxide in MTA reacts with tissue fluids to form Calcium Hydroxide, resulting in hard tissue formation. MTA is capable of activation of cementoblasts and production of cementum. It consistently allows for the overgrowth of cementum and also facilitates regeneration of the periodontal ligament. MTA allows bone healing and eliminates clinical symptoms in many cases<sup>5</sup>.

In this case, MTA was selected because of its known abilities for repairing, sealing and mechanically strengthening the weak lateral walls. MTA has many favourable properties, which include good sealing properties, biocompatibility, bactericidal effects and radiopacity. White MTA was used because it was a low iron and nonstaining formula<sup>11</sup>.

## CONCLUSION

Internal root resorption is often difficult to distinguish since resorptive defect is often asymptomatic, usually recognized by routine radiographs. In this case, the diagnosis of internal resorption was based on the patient's radiographic examination and clinical features.

In this case, Calcium Hydroxide plus instrumentation was effective in dissolving and flushing granulation tissue. But radiographic examination showed there was Calcium Hydroxide paste resorption. The use of MTA sealed the defect well. The patient returned after seven months with no signs or symptoms. The tooth was in function with no discomfort or pain during that time. Finally, the treatment of the defect with MTA was considered successful as evidenced by clinical and radiographic finding.

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MAIN LECTURE		
No	Judul	Durasi (jam)
1	Secrets to Endodontic Success - getting the basics right Dr. Leroy McCully	1
2	On debridement of root canals Dr. Abhishek Parolia	1
3	Management of C-Shape root canal Dr. Fan Bing	2
4	Successful composite restoration Professor Moriaki Fujitani, DDS, PhD, FICD	1
5	Composite resin, polymer Bis-GMA, dental adhesives, dentin bonding, degree of conversion, hardness and toxicity Dr. Isabel Cristina Celenino de Moraes Porto, MS, DDS, PhD	1
6	Over-Coring Problems in Endodontics Edmond K. Chow, D.D.S.	1
7	Review Up-Date Treatment in Pero-Endodontik Prof. Dr. Moh. Rubianto, drg., SpP(K), MS	1
8	Use of Marine Waste Honeycomb Crab Shell (Tachyporeus Gigas) in Biomaterial Engineering for Treatment in Conservative Dentistry Prof. Trimurni Abidin, drg., SpKG(K), MKes	1
9	Light in External Bleaching: Myth and Reality Bambang Nursasongko, drg., SpKG(K)	1
10	Optimizing single visit disinfection Bernard O. Iskandar, drg., SpKG	1
11	Resin Composite restoration using parallel self threaded dowel Prabadi Santoso, drg., SpKG	1
12	Endodontic Implant: Revitalization Classical theory in Conservative Dentistry Taufik Hidayat, drg., SpKG	1
13	Extract of propolis as an alternative of pulp capping material Dr. Ira Widjastuti, drg., SpKG(K), MKes	1
14	The "Double D" in endodontic Marino Sutedjo, drg., SpKG	2
15	New alternative biomaterial for conservatif treatment Dr. Elly Munadikroh, drg., MS	1
16	The clinical management of integrated orthodontic-endodontic therapy Dr. Ida Bagus Narmada, drg., SpOrt(K), MS	1
17	DAMP responses to damage and cell death in dental therapy Dr. Retno Indrawati, drg., MS	1
18	What endodontist should know about orthodontic treatment Dr. Haryono Utomo, drg., SpOrt	1
19	Tissue engineering and regenerative dentistry in conservative dentistry: current concepts Yolita Suantillo, drg., SpKG, PhD	1
20	Access cavity preparation-an anatomical and clinical perspective DR. Dian Agustin Wahjuningrum, drg., SpKG	1
21	Simple and easy to manage root canal failed to successful endodontic Dr. Tamara Yunita, drg., SpKG(K), MS	1

SHORT LECTURE		
TOPIC	DURATION (minutes)	Total (minutes)
Short Lecture	15	1140

TABLE CLINIC		
No	Judul	Durasi (jam)
1	"Revolutionary technique to active successful endodontic treatment" Dr. Leroy McCully	3
2	"Light in External Bleaching: Myth and Reality" Bambang Nursasongko, drg., SpKG(K)	3
3	"Successful composite restoration" Prof. Moriaki Fujitani, DDS, PhD, FICD	3
4	"Update one visit endodontic treatment with simple instrument" Nirawati Prabadi, drg., SpKG(K), MKes; Nanik Zubaidah, drg., SpKG(K), MKes	3
5	"Fast and simple esthetic direct veneer" Cecilia GJ Lunardi, drg., SpKG(K), MS	3
6	The "Double D" in endodontic Marino Sutedjo, drg., SpKG	3

**SKP for Scientific Meeting and National Congress:**  
(SK No. SKP /035rev/PBPDGI/VIII/2014:

Scientific Meeting Participant	: 8.5 SKP
Main Lecture	: 3 SKP
Short Lecture	: 3 SKP
Scientific Meeting Moderator	: 3 SKP
Table Clinic Trainer	: 5 SKP
Table Clinic Participant	: 3.5 SKP
Congress Participant	: 4 SKP
Committee Member	: 3 SKP

Chairman of Organizing Committee

*Ari Subiyanto*

Ari Subiyanto, drg., SpKG(K), M.Kes

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