THE 10th NATIONAL CONGRESS &
THE 3th INTERNATIONAL SCIENTIFIC MEETING (TINI III) OF
THE INDONESIAN CONSERVATIVE DENTISTRY ASSOCIATION

Theme:
Revolutionizing Endore stomation in
Global Community

Proceeding

November 27-29th, 2014
Shangri-La Hotel
Surabaya

Secretariat:
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
PROSIDING
TEMU ILMIAH NASIONAL
IKORGI III (TINI III)
Surabaya, 27 – 29 November 2014

EDITOR:
Prof. Dr. Latief Mooduto, drg., SpKG(K), MS
Prof. Dr. Adioro Soetojo, drg., SpKG(K), MS
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Cecilia G.J. Lunardhi, drg., Sp.KG(K), MS
Febriastuti Cahyani, drg., SpKG
Eric Priyo Prasetyo, drg., SpKG

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Endodontic treatment of internal root resorption using mta in incisor mandibular: a case report

Juni Jeki Nugroho1, Nurul Wadudah AS2
Department of Conservative Dentistry, Dentistry Hasanuddin University, Makassar2
Resident of Dental Conservation, Specialist Dentistry Educational Program, Dentistry Hasanuddin University, Makassar1

Abstract
Introduction: Internal root resorption is a progressive destruction of intra-radicular dentin and dentinal tubules along the middle third and apical third of the root canal wall due to chronic inflammation and bacterial invasion of the pulp. Case: A 32-year-old female patient complained a decay in her linguo-cervical of #31 and wanted to restore her tooth. It was also mobile 3°. Case management: root canal treatment is done to maintain #31 teeth with a hybrid technique, using sectional gutta-percha obturation and Mineral Trioxide Aggregate (MTA) application. Discussion: Mineral Trioxide Aggregate has chosen to treat internal root resorption because it is an excellent repaired material with good sealing ability and mechanical strength.

Keywords: internal root resorption, Mineral Trioxide Aggregate

Corresponden: Juni Jeki Nugroho, Department of Conservative Dentistry, Dentistry Hasanuddin University, Jl. Perintis Kemerdekaan Km.10, Makassar - Indonesia, Mobile. 081355229964; e-Mail: jekijuni@yahoo.co.id

INTRODUCTION
Internal root resorption has been described as a resorptive defect of the internal aspect of the root following necrosis of odontoblasts as a result of chronic inflammation and bacterial invasion of the pulp tissue.1 Internal root resorption is a pathological phenomenon that is characterized by loss of dentin due to the action of elastic cells.2,3,4 Root resorption may occur as a physiologic remodeling throughout life, root resorption of permanent teeth does not occur naturally and is invariably inflammatory in nature. Thus, root resorption in the permanent dentition is a pathologic event; if untreated, this might result in the premature loss of the affected teeth.2,5,6

Root resorption might be broadly classified into external, internal and periapical resorption. Internal root resorption divides into intracoronal and intracanal type. Internal root resorption might occur along coronal, the middle and apical thirds of the canal walls.2,3,6 Incorrect diagnosis might result in inappropriate treatment in certain cases.

Intraradicular internal resorption is an inflammatory condition that results in progressive destruction of intraradicular dentin and dentinal tubules along the middle and apical thirds of the canal walls. The resorptive spaces might be filled by granulation tissue only or in combination with bone-like or cementum-like mineralized tissues.2,6 Compared with intraradicular internal resorption, apical internal resorption is a fairly common occurrence in teeth with periapical lesions.2 The authors examined the extent of internal resorption in 75 roots (69 roots with radiolucent lesions and 6 vital control roots) and graded the severity of resorption on a 4 point scale. They concluded that 75% of teeth associated with periapical lesions had internal apical resorption and that vital teeth had statistically less apical internal resorption than teeth with periapical lesions. Severe internal resorption could be identified in 48% of those cases with periapical lesions. Conversely, only 1 root in the control group displayed mild internal resorption, which was speculated to be transient in nature as a result of trauma.2,3

Etiology of internal root resorption is quite unclear. In a study of 27 teeth with internal resorption, trauma was found to be the most common predisposing factor that was responsible
for (45%) of the cases examined followed by
caries lesions (25%).3,4,5,6 Other predispose
factors including trauma, pulpitis, pulpotomy,
cracked tooth, tooth transplants, restoration
procedures, invagination, orthodontic treatments,
and even herpes zoster infection.6,7 It was
concluded that trauma and pulp
inflammation/infection are the major contributory
factors in the initiation of internal resorption.1,3-7

This paper presented a case of internal
root resorption on mandibular central incisor
which was treated with endodontic treatment and
MTA repair.

CASE

A 32-year-old female patient complained
decay in her lingual-cervical of #31 (Figure 1a
& 1b). The patient's medical history was non-
contributory. The tooth never caused a
spontaneous pain. Currently, she is wearing
orthodontic appliances for about 3 years.
Thermal sensitivity test was negative and tooth
mobility was +3. Periapical radiograph and
computed tomography scan showed a well-
defined radioluent area on middle third of root
canal, which indicated internal resorption and
periapical radiolucency. Alveolar bone only
supported apical third of root aspect (Figure 2a &
2b).

The possibility of conserving tooth #31
was considered through a hybrid technique by
combining cold gutta-percha obturation and
internal MTA repair.

CASE MANAGEMENT

The tooth was isolated with a rubber dam
without a clamp, to avoid the possibility of
horizontal fracture. After coronal access, the pulp
tissue was removed. After working length
determination which is 18 mm, the canal was
shaped with # F1-F3 proTaper rotary files and
lubricant. This was accompanied by copious
irrigation with 1% sodium hypochlorite. Calcium
hydroxide paste was placed for 1 week as root

canal dressing (Figure 3a & 3b).

On the next appointment, the root canal
dressing was removed with 1% sodium
hypochlorite, then irrigated using saline solution
and dried with sterile paper points. The apical
third of root canal was filled with F3 sized gutta-
percha and resin sealer, we called this sectional
obturation (Figure 4a). Next, white MTA was
applied on internal resorption area, using
amalgam carrier and condensed with finger
plugger until the canal filled completely (Figure
4b). A moist cotton pellet was applied above the
white MTA, then cavity access was filled with
temporary restoration.
DISCUSSION

Resorption is a condition associated with either a physiologic or a pathologic process resulting in a loss of dentine, cementum, and/or bone. Root resorption may occur after various injuries, including mechanical, chemical, or thermal. Internal resorption is an inflammatory process initiated within the pulp space with loss of dentine and possible invasion of the cementum [3,4].

Internal root resorption is usually asymptomatic [1,3,5,6,8] and often recognized on clinically through routine radiography. Pain may occur depending on the pulpal condition or perforation of the root resulting in a periodontal lesion. However, clinical signs may vary according to the location and its wideness. If internal resorption is located in the coronal part of the canal, a clinical aspect of “pink spot” can be observed. The pink color turns grey/dark grey when the pulp becomes necrotic [1,3,5,6,8].

For internal resorption to take place, vital apical pulp adjacent to resorption areas is required. If left untreated, internal resorption will grow significantly until the inflamed connective tissue filling the resorption defects degenerate, hence the lesion will grows toward apical direction. Finally, if left untreated, apical pulp tissues of the resorption lesion undergoes necrosis, bacterial will infect all of the root canal system, and triggers an apical periodontitis. The development of complete pulp necrosis stops the growth of the resorption because the resorptive cells are cut off from the blood supply and nutrients if the pulp chamber is sealed [2,3,4,6,8].

Internal root resorption may be located everywhere within the root canal system. Intraoral radiography showed an oval enlargement within the pulp chamber or root canal [1,2,3,6]. This condition is undetected until the lesion undergoes significant development that perforated or causing acute/chronic apical periodontitis as consequences of total pulp necrosis and infected pulp chamber [2,6].

Internal root radiolucencies are not detectable on radiographs at their early stages, when they are small, or because of limitations of this 2-dimensional method. Cone beam computerized tomography (CBCT) provides a 3-
dimensional view of the resorption with axial, coronal, parasagittal views of the anatomy. Cone beam computerized tomography is a more powerful tool which allows an earlier and more accurate diagnosis of these lesions. (1,2,3,6)

Root canal treatment remains the treatment of choice of internal root resorption as it removes the granulation tissue and blood supply of the elastic cells. (1,3,5,6,8,9) Internal root resorption presents specific difficulties in instrumentation and filling. The access cavity preparation must be as conservative as possible to preserve tooth structure and avoid further root fractures. (3,5,6,8)

Because of the limited access by instruments to all areas of the resorption cavity, chemical means are needed to completely clean the canal. Irrigation with sodium hypochlorite (NaOCl) is an important part of the treatment of teeth with internal resorption. In small perforations, hypochlorite will help to control bleeding from perforation and disinfect and clean the area with perforation complications. However, with large perforations, low-concentration hypochlorite solutions should be used and other irrigants, such as chlorhexidine should be considered. (5,6)

The use of calcium hydroxide as an interappointment dressing maximizes the effect of disinfection procedures, helps to control bleeding, and necrotizes residual pulp tissues, maintains the alkalinity, prevents recurrent resorption. (3,5,8) Studies on the effectiveness of sodium hypochlorite and calcium hydroxide to remove the resorption and other tissues from the root canal indicate that they have an additive or even synergistic effect. In cases where the resorption has not perforated, it is usually enough to use calcium hydroxide paste in the canal once from 1 to 2 weeks. This allows removal of the residual tissue at the next appointment by irrigation and instrumentation. (6,10)

In this case, hybrid technique with section gutta-percha and white MTA were used in the obturation. Apical third of the root canal was filled with F3 sized section gutta-percha. After that MTA was done on middle third of root canal (resorption lacuna) to the rest of root canal, because it was difficult to apply and condense MTA in a narrow root canal diameter. MTA repair was used because it was a bioactive, biocompatible material with favorable sealing ability and well-tolerated by the periradicular tissue. (6,7,9,11)

CONCLUSION

Internal root resorption is relatively rare root resorption on permanent teeth. This pathologic lesion caused by pulp inflammation and bacterial invasion. MTA is an excellent alternative to repair internal root resorption. In this case, the patient’s tooth was symptom-free and functional after 1 month follow up.

SUGGESTION

Further follow up was needed to confirm that the resorptive process has stopped and to control the tooth mobility after referred for treatment by a periodontist.
The obturation technique chosen to treat internal root resorption depends on the condition of tooth and equipments available, which one is most easily done with the maximum result.

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