



Management Of Inflammatory Apical Root Resorption: A Case Report

Dr. Seema D. Pathak¹, Dr. Pradnya V. Bansode², Dr. M. B. Wavdhane³, Dr. Geetam U. Duduskar⁴

¹Professor, ²Head of the Department, ³Associate Professor, ⁴MDS Student,

Department of Conservative Dentistry and Endodontics, GDC & Hospital, Aurangabad/ MUHS, India

***Corresponding Author:**

Dr. Geetam Uttam Duduskar

MDS Student, Department of Conservative Dentistry and Endodontics, GDC & Hospital,
Aurangabad/ MUHS, India

Type of Publication: Case Report

Conflicts of Interest: Nil

Abstract

Trauma to anterior teeth is most common complaint in dental clinics. Inflammatory external root resorption is one of the major complications after traumatic dental injury. It occurs when there has been loss of cementum due to damage to the external surface of the tooth root during trauma, plus the root canal system has become infected with bacteria. It is characterized by the radiographic appearance of loss of tooth substance with a radiolucency in the apical periodontal ligament and bone. If not diagnosed and treated early it may lead to loss of teeth.

This case report shows management of traumatically induced inflammatory apical root resorption

Keywords: Trauma, resorption, calcium hydroxide, MTA

Introduction

Oral trauma comprises 5% of all injuries. As a sequelae of oral trauma: cracks, fracture, avulsion, pulp necrosis, resorption of root, root canal obliteration, damage to permanent tooth buds, etc can occur.¹

Dental resorption is the loss of dental hard tissues as a result of clastic activities. It may occur as a physiologic or pathologic phenomenon². Root resorption is an important complication of traumatic injuries of teeth including intrusion, avulsion and luxations. Normally, an intact tooth is resistant to resorption, even if inflammation is present³. This pathologic condition may be discovered by routine radiographic examination, it has no sign and symptoms and remains most of the times asymptomatic⁴.

Etiology of the resorption-traumatic injuries like intrusion, extrusion, luxation, apical periodontitis, expanding tumors and cysts, or heavy orthodontic forces can also initiate inflammatory root resorption³

. Some cases of external resorption can be classified as idiopathic with unknown or unproven causes. It occurs as solitary or the multiple form, hyperparathyroidism, hypocalcaemia, hypophosphatemia, and Paget's disease may play a role in the development of these lesions⁷.

External root resorption (ERR) is a pathologic condition that is caused by several etiological factors, this inflammatory response can exacerbate in the presence of bacteria and their by-products inside the root canal system and dentinal tubules after pulp necrosis and in the absence of protection of cementum barriers. If allowed to progress, the resorption process may lead to rapid tooth loss⁶.

External root resorption is a progressive condition with a potentially rapid onset, and it is capable of advancing rapidly, such that an entire root surface may be resorbed within a few months if the tooth is left untreated².

The proper follow up and radiographic evaluation at each visit in this case gives the early diagnosis and

hence helps to save the tooth of patient. In this case report management of external inflammatory root resorption with Calcium hydroxide and Mineral trioxide aggregate has been explained.

Case Report-

A 17 year old female patient with chief complaint of mobile teeth reported to the Department of Conservative Dentistry and Endodontics with her parents. Parents gave history of trauma 2 days ago due to fall from bike. On clinical examination grade 1 mobility with 11, 12, 21, 22 was seen. Surrounding hard and soft tissues were normal. Patient had dull aching pain, 11 and 21 were tender on percussion. Electric pulp testing of 21 gave delayed response while all other teeth gave normal response. The alignment of teeth was not disturbed as told by patient's parents. Intraoral periapical radiograph was taken and observed. There was no significant finding on radiographic evaluation. Depending on all factors teeth were disoccluded followed by splinting of upper anterior teeth with follow up after every 15 days was decided as treatment plan for the patient.

Treatment Plan And Procedure-

All upper anterior teeth were cleaned and dried. The etching gel was applied between coronal third to middle third of all upper anterior teeth for 15 seconds. Then the etchant was removed using water spray and again dried and isolated. Afterwards bonding agent was applied and then cured for 20 seconds. The splinting wire was adjusted and splinted with help of flowable composite resin. Patient was recalled after 7 days.

On next appointment only 11 and 21 were slightly mobile so continuation of splinting for next 7 days was decided. On next visit all the teeth were completely firm and there was no pain, teeth were non tender on percussion. Removal of splint was done followed by polishing of teeth to remove composite resin on teeth. Intraoral periapical radiograph was taken and observed. There was no significant finding on radiographic evaluation. Patient was recalled after every 15 days for follow up. After 2.5 months the radiographic changes were observed at apical portion of 21 resembling as open apex with irregular borders. Depending on clinical history of trauma and radiographic findings apical inflammatory root resorption was diagnosed.

Under rubber dam isolation, access opening was done with 21 in the same appointment, working length was measured, followed by cleaning shaping apically till 60 no K file, debridement and irrigation with sodium hypochlorite and normal saline. After complete debridement and irrigation canal was dried using paper points. Then calcium hydroxide dressing was given and temporary dressing was placed. Patient was recalled after 14 days. New calcium hydroxide dressing was placed in 2nd appointment of root canal therapy. After 14 days radiographs were evaluated and observed that there was no further resorption at apex of 21. MTA barrier (3 to 4 mm) was placed apically using pluggers, as there was no apical stop during obturation procedure. Then after setting of MTA, obturation was completed with lateral condensation method. Follow up for 1 month, 3 months and 6 months was done. Patient was not having any complaint and radiographically there were no further changes seen.

Checking mobility of teeth



Splinting from upper canine to canine



Preoperative intra oral periapical x ray at 1st visit



Preoperative intra oral periapical x ray 2.5 months after trauma



Access opening under rubber dam isolation with 21



Working length determination with 21



Intracanal medication (CaOH) with 21



Apical barrier with MTA



Post obturation intra oral periapical x ray with 21



6 months follow up intra oral periapical x ray with 21



Discussion-

For the management of the root resorption, early detection is the key to success because, if detected earlier, the resorption process can be halted¹. The challenge of successful endodontics facilitating cessation of resorption is the need for efficient cleaning, debridement and disinfection followed by optimal apical seal¹.

The tooth in question may look normal, but it will not respond positively to vitality testing or may give delayed response. In advanced cases, signs of pulp or periapical periodontitis may be present (e.g., discolored tooth, sinus may present, and/or tenderness to percussion and/or palpation)². The diagnosis mostly made by radiographic interpretation.

Pathogenesis of external inflammatory root resorption include- Contusion injuries to the PDL, after a traumatic dental injury involving the periodontal structures, initiate wound healing, during which the osteoclasts and macrophages are attracted to the site of the injury to remove the damaged tissue. The initial injury causes a breach in the integrity of the protective precementum. This permits odontoclasts to bind to and resorb the underlying mineralized cementum and dentin in a manner similar to the development of surface resorption².

Treatment modality includes removal of causal agent, infected necrotic pulp, cleaning and shaping, intracanal medicament followed by biocompatible apical seal and obturation.

In case of inflammation and resorption Calcium hydroxide is the gold-standard intracanal dressing

material for teeth subjected to traumatic avulsion, luxation etc⁸.

Tronstad advocated the use of calcium hydroxide as a temporary intracanal medicament in the management of root resorption. The high alkaline pH of it will neutralize the lactic acid secreted by osteoclasts and the demineralization process will cease⁷.

Calcium hydroxide is by far the most widely used intracanal medication because it has several desirable properties, most notably inhibition of bacterial enzymes, antimicrobial effects, activation of tissue enzymes such as alkaline phosphatase, and stimulation of mineralization⁸. Purpose of calcium hydroxide treatment of traumatized teeth is to achieve the arrest of inflammatory root resorption and healing of the periodontal ligament⁵. Long-term dressing of the root canal with calcium hydroxide may be beneficial in the treatment of established resorption².

At the same time, Calcium hydroxide should not be used as an immediate (after trauma) medicament because of its irritant properties but it is valuable as a subsequent medicament to encourage hard tissue repair where required⁹.

When the pathway of communication is opened between the root canal and the periodontium it must be sealed with materials that preserve the bacterial leakage, the material should be biocompatible and should favor regeneration of supporting structure⁶.

MTA and Calcium hydroxide have some common points when they are compared to each other such as mechanisms of action, both of them are antibacterial and have biocompatible properties, pH is high, radio-opacity and its ability to help in the formation of bioactive dentin proteins⁴.

MTA has several desirable properties in terms of its biocompatibility, bioactivity, hydrophilic, radio-opacity, sealing ability and also low solubility. MTA has the ability to form hydroxyapatite like layer when it comes in contact with physiologic fluid having good sealing property and encourages regeneration of periodontal ligament, bone and cementum making it as choice of material in the management of root resorption¹.

Follow up of resorption cases with radiographs at regular interval are necessary to evaluate the

stoppage of resorption process, resolution in radiolucency and healing of periodontal tissues.

In the present case early detection is possible because of follow up of patient, radiographs at regular interval that helps to evaluate changes in tooth or periodontium at apical area. The treatment helps to save the teeth of patient and so the emotional and psychological well being of patient due to esthetic concerns.

Conclusion-

Traumatic injuries of teeth are most of the time the cause of root resorption. So proper follow up after trauma, radiographic evaluation at regular interval are necessary. Early diagnosis of resorption in case of anterior teeth not only helps to save teeth but also esthetics of patient is maintained. Management of inflammatory external root resorption by early diagnosis followed by complete debridement, disinfection and good apical seal is key to success.

References-

1. Bantawa S, Agrawal N, Vikram M, Singh V, Ayer A, Rai A, Shrestha S. Management of Traumatic Inflammatory External Root Resorption. *JCMS Nepal*. 2019;15(1):71-4
2. KENNETH M. HARGREAVES, LOUIS H. BERMAN, ILAN ROTSTEIN, COHEN'S PATHWAYS OF THE PULP, Eleventh Edition, ISBN 978-0-323-09635-5
3. Irem Gu" zeler, Serdar Uysal, Zafer C. Cehreli, Management of trauma-induced inflammatory root resorption using mineral trioxide aggregate obturation: two-year follow up, *Dental Traumatology* 2010; 26: 501-504; doi: 10.1111/j.1600-9657.2010.00932.x
4. Abdelaziz Magdy Fahmy, Mohamed Yehia Mohamed Hassan and Mohamed Emad Salama, Management of external root resorption by using mineral trioxide aggregate (MTA): A case report, *International Journal of Applied Dental Sciences* 2019; 5(4): 350-352.
5. Zeynep Bas,ak O" ktem, Tug"ba C, etinbas,, Levent O" zer, Hayriye So"nmez, Treatment of aggressive external root resorption with calcium hydroxide medicaments: a case report, *Dental Traumatology* 2009; 25: 527-531; doi: 10.1111/j.1600-9657.2009.00790.x.

6. Ashwini TS, Hosmani N, Patil CR, Yalgi VS. Role of mineral trioxide aggregate in management of external root resorption. *J Conserv Dent* 2013;16:579-81
7. Jozef Mincik, Daniel Urban, and Silvia Timkova, Clinical Management of Two Root Resorption Cases in Endodontic Practice, Hindawi Publishing Corporation Case Reports in Dentistry Volume 2016, Article ID 9075363.
8. Maryam Zare Jahromi, Mahmood Reza Kalantar Motamedi, Effect of calcium hydroxide on inflammatory root resorption and ankylosis in replanted teeth compared with other intracanal materials: a review, *Restor Dent Endod.* 2019 Aug;44(3):e32 <https://doi.org/10.5395/rde.2019>.
9. PV Abbott, Prevention and management of external inflammatory resorption following trauma to teeth, *Australian Dental Journal* 2016; 61:(1 Suppl): 82–94 doi: 10.1111/adj.12400