PERFORATING INTERNAL RESORPTION: REVIEW AND CASE REPORTS

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Tooth resorption is a common sequalae following injuries to or irritation of the periodontal ligament/ or tooth pulp. Pathological process like internal resorption pose technical difficulties for the thorough cleaning & obturation of the root canal. Due to many complex irregularities it is impossible to determine the complete anatomical extent of the internal resorption either clinically or radiographically. When internal resorption progresses through the tooth into the periodontium there are additional problems of periodontal bleeding, pain & difficulty in obturation. These cases of of perforating internal resorption can be treated by a nonsurgical or surgical approach. The purpose of this paper is to report 2 cases of perforating internal resorption where one case was treated nonsurgically using MTA for sealing the perforation. The 2nd case required a surgical approach & the perforation defect was sealed with glass ionomer cement. Finally obturation was carried out using thermoplasticized gutta percha.

Keywords: Internal resorption, Perforation, Thermoplasticized gutta percha, MTA

INTRODUCTION

The golden rule of endodontics is to debride and obturate the canals as efficiently and three dimensionally as possible. The complex irregularities of the root canal system, as well as those resulting from pathological processes, such as internal resorption pose technical difficulties for the thorough cleaning and obturation of the root canal. The persistence of organic debris and bacteria in these irregularities may interfere with the long term success of the endodontic treatment. Moreover, it is impossible to determine the complete anatomical extent of the internal resorption, either clinically or radiographically.[1]

American association of Endodontics in 1998 described internal resorption as a pathological process initiated within the pulp space with loss of dentin. Trope defined it as an oval shaped enlargement of the root canal space and fothergill described it as pink spots.[2]

Clinical Manifestations

1. Usually the patient is asymptomatic and it is first recognized clinically through routine radiographs.
2. Pain may be a presenting symptom it perforation of the crown occurs and the metaplastic tissue is exposed to oral fluids.
3. For internal resorption to be active, at least part of the pulp must be vital so that a positive response to pulp sensitivity testing is possible. The clinician should remember that the coronal portion of the pulp is often necrotic, whereas the apical pulp, which includes the internal resorptive defect, can remain vital. Therefore a negative sensitivity testing does not rule out active internal resorption. It is also possible that the pulp becomes nonvital after a period of active resorption, giving a negative sensitivity test & radiographic signs of apical inflammation.
4. Pink-tooth – pathognomic of internal root resorption. Pink color is caused by granulation tissue in the coronal dentin undermining the crown enamel.[3]

Radiographic features:

Gartner et al 1976 described radiographic features of internal resorption.[4]

1. Margins are smooth and clearly defined.
2. Their distribution over the root is symmetrical but may be eccentric.

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3. The radiolucency is of uniform density.
4. The walls of the root canal system may appear to balloon out.

Diagnosis:

1. IOPA at different angulations to examine the complete anatomical extent of the lesion.
2. Apex locators – In case of perforating internal resorption an electronic measuring device will help to explore the walls of the canal using a file with curve placed near the tip. This assists in deciding whether the perforation is accessible for surgery.[5]
3. Conventional computed Tomography.
4. Cone beam computed Tomography – uses a cone shaped beam rather than a fan beam. The data volume acquired can be reconstructed into radiographic slices. In addition, three dimensionally reconstructions may also be performed.[6]

Treatment Options:

I. Without perforation
   1. Endodontic therapy

II. With perforation
   1. Nonsurgical
      a. MTA
      b. $Ca(OH)_2$ therapy followed by thermoplasticized obturation.
   2. Surgical
      a. Surgical flap and scaling the defect with GIC, MTA, Alloy, Super EBA.
      b. Root Resection
      c. Intentional Replantation.

This paper presents 2 case reports of perforating internal resorption where one case was treated with a nonsurgical approach & the other was surgically treated.

Case Report I:

A 32 year old male patient reported to the Department of Conservative Dentistry and Endodontics with a chief complaint of mild pain in 21. Radiographic examination revealed a radiolucent lesion in the middle third of root in relation to 21. No response could be elicited from the tooth using the electric pulp tester or a hot and cold test. The remaining anterior teeth responded within normal limits. Further radiographs at different angulations revealed an internal resorption lesion.

Access to the canal system was established. Working length was determined. The original canal was negotiable, but the canal could not be completely dried because of continuous hemorrhage, indicating a perforating internal resorption. As the lesion was apical to crestal bone it was decided to treat the case nonsurgically. Removal of all inflamed tissue from the resorption defect is the basis of successful treatment so the canal was cleaned thoroughly using H file and copious irrigation with NaOCl followed by calcium hydroxide dressing for 1 week.

At the next appointment calcium hydroxide was removed from the canal. The canal was dry with absence of hemorrhage in the canal. The apical third was obturated using the sectional method (Fig.1). MTA was mixed according to the manufacturer's instructions and was carried into the canal using pluggers to seal the defect. As MTA sets in the presence of moisture a moist cotton pellet was placed in the canal. Temporary filling with Glass Ionomer cement was done. To confirm that the defect has been sealed 'check radiographs' at different angulations were taken (Fig.2).

After 24 hrs the temporary filling and moist cotton pellet were removed. Because of the size, irregularity and in accessibility of the resorptive defect, back filling of the canal and the defect was done with thermoplasticized gutta percha (E&Q Plus) (Fig.3 & 4). Radiographs both on mesial & distal angulations were taken to ensure uniform obturation with no voids. Coronal sealing was done with composite resin. 6 months recall radiographs showed satisfactory results (Fig.5).

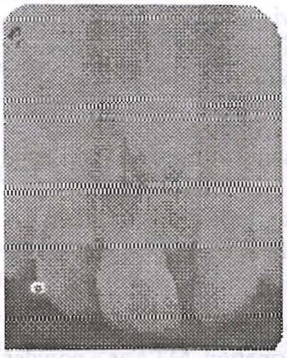


Fig.1 : IOPA showing resorption defect & obturation done in apical third with sectional method.

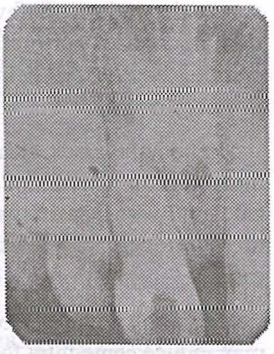


Fig.2 : IOPA showing resorption defect sealed with MTA.



Fig.3: Obturation done with thermoplasticized gutta percha (E&Q Plus).

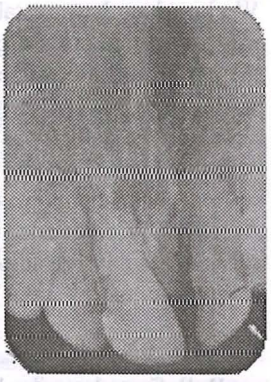


Fig.4 : IOPA showing obturation done with thermoplasticized gutta-percha.

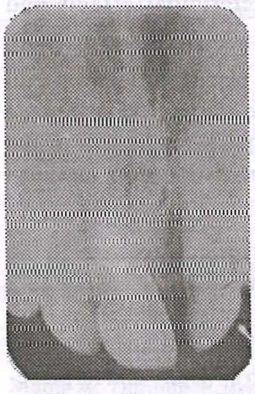


Fig.5 : Six months post operative IOPA.

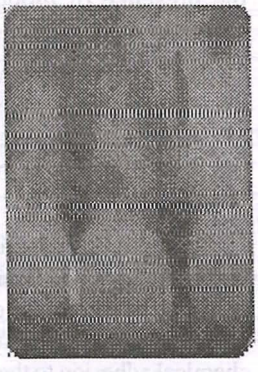


Fig 6: Pre-operative IOPA showing resorption defect at the level of crestal bone.



Fig 7: Flap elevated & bony window exposed to show resorption defect.

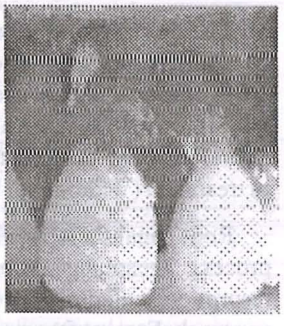


Fig 8: Resorption defect sealed with glass ionomer cement.



Fig 9: IOPA showing obturation done with thermoplasticized gutta-percha.

Case II:

A 32 years old male presented to our department with a chief complaint of draining sinus in relation to 11. Clinical and radiographic examination showed a perforating internal resorptive defect in relation to 11 (Fig.6). Electric sensitivity and thermal testing were nonresponsive. A file with a curve placed near the tip along with apex locator was used for determining the site of perforation. As the lesion was close to the crestal bone it was decided to treat the case surgically. Access opening was done under rubber dam.

Working length was established. Cleaning and shaping was carried out. Surgical flap was elevated and the perforated site was exposed by forming a bony window (fig.7). The surgical field was cleaned, isolated and the defect was sealed with glass ionomer cement Fig.8). The flap was sutured and the canal obturated with thermoplasticized gutta-percha (Fig.9). Access cavity was sealed with composite resin. Clinical examination and radiographic finding showed satisfying results.

DISCUSSION

Bell first described a tooth having internal resorption in 1830.[7] Traditionally, internal resorption has been associated with a long standing chronic inflammation in the pulp. The resorptive process is sustained by infection of necrotic pulp tissue in the root canal coronal to the area where the resorption takes place.[8]

The devastation rate of internal resorption may be rapid or slow. Spontaneous repair is extremely rare. The 'wait and see' concept may mean the loss of tooth or possible surgical intervention to retain it. Therefore, immediate root canal therapy is the choice of treatment (Walton et al 1985, Chivian 1987).[9,11]

Root canal therapy will interrupt the resorptive process. Treatment option for perforating internal resorption includes both a surgical or nonsurgical approach. Factors favoring Non surgical Repair

1. When the defect is not extensive.
2. When the defect is apical to epithelial attachment.
3. Where the hemorrhage can be controlled.

Removal of all inflamed tissue from the resorption defect is basis of successful treatment so copious irrigation with NaOCl followed by calcium hydroxide dressing is considered to be an essential part of the treatment to debride the resorbed intra canal defect. (Stamos and Stamos 1986).[7]

Calcium hydroxide dressing may help to dissolve residual pulp tissue inaccessible to the initial chemomechanical debridement (Hasselgren et al 1985) eliminate microorganisms (Stevens and Grossman 1983: Safavi et al 1985: Bystrom et al 1985) and inactivate toxic products (Safavi and others 1993). In addition, in cases of perforating internal resorption calcium hydroxide may help to stimulate the formation of a hard barrier.[11-15]

In both the cases, cleaning of the canal was done using copious amount of 2.25% NaOCl followed by calcium hydroxide dressing for 1 week. Calcium hydroxide totally stopped the bleeding present in the canal.

MTA is known as a biocompatible material that may induce cementum formation. MTA is a powder that sets in the presence of moisture and has a pH of 12.5. The setting time of the cement is 4 hrs and its compressive strength at 21 days is 70 MPa. MTA has been proven to be a material with several potential clinical applications because of its ability to set in the presence of blood, bactericidal effects and biocompatibility.[16-22]

In case report I MTA was placed in the canal with the use of pluggers to seal the defect. The advantage of using MTA here was that, since it sets in the presence of moisture the perforation was successfully repaired.

In the second case as the lesion was close to the crestal bone it was decided to treat the case with a surgical approach. The defect was sealed with Glass Ionomer cement because it has the advantage of chemical adhesion to the tooth structure and its placement is not technique sensitive.

Various obturation techniques have been advocated by different authors to obturate internal resorption defects. Fvand and Weine have suggested the use of heavy lateral and vertical condensation of gutta-percha for such cases. Gutman et al have suggested the use of Thermafil obturation technique.[23] Weine recommends the use of thermo mechanical compaction. Among these thermoplasticized gutta-percha has been shown to be superior. Thermoplasticized gutta-percha has been shown to give an impression like reproduction of the irregularities of the root canal space.

In the 1st case the apical 3rd of the canal was obturated with gutta percha using sectional method.

In both the cases the defect and the canal was backfilled using thermoplasticized gutta-percha. Radiographs at different angulations were taken to confirm the extent of obturation.

CONCLUSION

"Success is related to accurate diagnosis & a full understanding of the biological processes to be facilitated by the treatment." So identification of the stimulation factor for root resorption & its location is important for proper treatment. Thus it can be concluded that with the advent of MTA & thermoplasticized gutta percha it is possible to seal the resorptive defect with great success.

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