Case Report

Management of external and internal root resorption – A report of two cases

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Abstract

Internal resorption of teeth is an insidious process and is generally found in teeth with previous history of trauma. It is important to diagnose this condition and perform treatment as early as possible to improve the prognosis of such teeth. This was treated non- surgically with gutta flow obturation technique. External apical root resorption in permanent dentition is usually pathological. Local factors are the most frequent causes of resorption, especially excessive pressure and inflammation. Depending upon the type of resorption and etiology, different treatment regimens have been proposed. Non-surgical root canal therapy was performed with the use of calcium hydroxide as an intracanal medicament. 2% chlorhexidine and smear clear irrigating solution was used as a vehicle and MTA was used for apexification. In this case both internal and external resorption was seen in same patient in upper central incisors (11 and 21). One year follow up demonstrated clinically asymptomatic and adequately functional tooth, with radiographic signs of healing.

Keywords: External apical root resorption, calcium hydroxide, 2% chlorhexidine and MTA. Internal root resorption and guttaflow obturation material.

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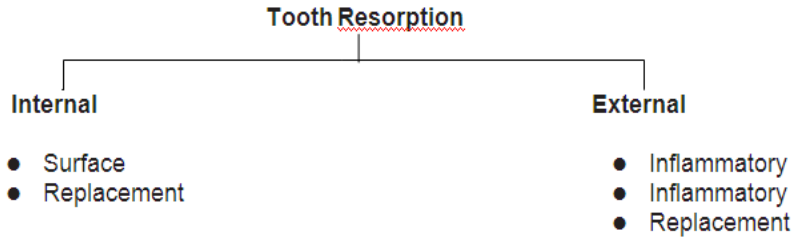
INTRODUCTION

Resorption is a condition associated with either a physiologic or a pathologic process resulting in a loss of dentin, cementum, and bone. Generally, it can be classified as internal or external root resorption. External root resorption is caused by an injury such as concussion or subluxation, resulting in a localized inflammatory resorption. Internal resorption is an inflammatory process initiated within the pulp space with loss of dentin and usually contains some vital pulp and resolves with root canal treatment.[1,2]

CLASSIFICATION

Classifications play an important role for the clinician in the process of diagnosis and treatment planning. Andreasen has made a unique contribution to the understanding of tooth resorption following dental trauma and his original classification remains the most widely accepted[3] i.e.



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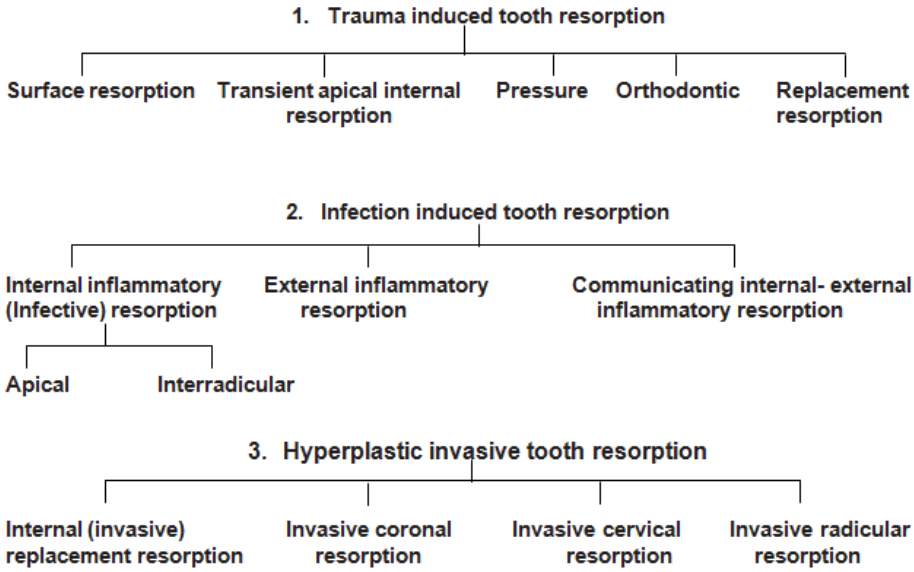
Classification of tooth resorption proposed by Lindskog subdivides resorption into 3 broad groups namely.

1. Trauma induced tooth resorption
2. Infection induced tooth resorption
3. Hyperplastic invasive tooth resorption



DIAGNOSIS

Various diagnostic tools used for detection of internal resorption are:

- Visual examination based on changed color in tooth crown
- Radiographic diagnosis
- Conventional and cone beam computed tomography
- Light microscopy

Teeth in which resorptive process reaches cervical area of the crown may have a pinkish color, known as 'pink tooth' resulting from granulation tissue in growth.[4,5] A radiograph of the affected tooth usually shows an oval enlargement (ballooning out) of the root canal space.[6] The pulp chamber and canal cannot be followed throughout the lesion.Radiograph performed at different angulation confirms that the resorptive lacunae is a continuation of the distorted border of the root canal. Cone beam computed tomography (CBCT) is a relatively new three dimensional imaging technique requiring a significantly lower radiation dose than conventional computed tomography. With traditional computed tomography, a narrow fan shaped X-ray beam makes a series of rotations around the patient's head as they are incrementally moved through the machine. The raw data from each rotation is then reconstructed to produce tomographic images. CBCT differs from conventional computed tomography imaging in that the whole volume of data is acquired in the course of a single sweep of the scanner.[6, 7] Light microscope shows different levels of inflammation of the pulpal tissue with infiltration of predominant lymphocytes, macrophages and some leukocytes, dilated blood vessels and multinucleated dentinoclasts in resorptive lacunae on the pulpal-dentin surface. Electron microscope shows the pulpal-dentin wall without odontoblasts. Dentinoclasts, large in number, have size of 50µm and with numerous phyllopod's are turned towards dentin surface and attached to it.[4]

DIFFERENTIAL DIAGNOSIS: 5, 8, 9

Internal resorption	External root resorption
Pinkish hue if resorptive process reaches cervical area.	Resorption of coronal dentin and enamel often creates a clinically
Internal replacement resorption is relatively rare and	obvious pinkish color in the tooth crown as highly vascular
may appear clinically as a pink area in the crown.	resorptive tissue becomes visible through thin residual enamel
Radiographically	(cervical resorption).
The margins are smooth and clearly defined.	When tooth structure is replaced with bone that fuses with dentin,
The walls of root canal system may appear to balloon out	it is termed as replacement resorption or ankylosis.
or bulge in shape	resorption or ankylosis.
The pulp chamber and the canal cannot be followed	**Radiographically**

throughout the lesion. Their distribution of the pulp canal is symmetrical but can be eccentric. The radiolucency is of uniform density. Lesion is within the confine of root canal on angled radiographs.	The border will be irregular and ill defined. If the lesion is superimposed on the root canal system, it should be possible to follow the canal walls unaltered through the area of defect. Their distribution is not symmetrical and can occur on any root surface. Their may be variations in the radiodensity of the body of lesion. Lesion shift on changing angulations.

CASE REPORT

A 20 years old female patient reported to the Department of Conservative and Endodontics, Sri, Hasanamba Dental College and Hospital, Hassan. With chief complaints of pus discharge and tooth discoloration in the upper front region of the tooth. Patient gave a history of trauma two years back. It was asymptomatic at that movement and patient did not seek for any treatment. After two years patient noticed discoloration of the tooth and undergone endodontic treatment three months back with respect to 11 in private clinic (fig 1). But after 3 months of endodontic treatment she had symptoms and pus discharge with the same tooth. Clinical examination revealed, tooth was tender on percussion and sinus opening with respect to 11. Preoperative radiograph demonstrates unsatisfactory access opening and obturation along with apical root resorption (fig1). Accidentally Internal root resorption was observed with respect to 21, which was found asymptomatic. Thermal and Electrical pulp testing revealed delayed response with respect to 21. Based on clinical and radiographic examination, the diagnosis of chronic periradicular abscess and external apical inflammatory root resorption with respect to 11 and internal root resorption with respect to 21 was observed (fig.1). Under aseptic condition endodontic retreatment with respect to 11 and endodontic treatment with respect to 21was performed (fig.2,3,4,5). Calcium hydroxide was used as a intracanal medicament, 2% chlorhexidine and smear clear irrigating solution was used with respect to both the teeth. MTA apexification followed by gutta-percha obturation with respect to 11(fig.5) and guttaflow obturation with respect to 21 (fig 6,7and8) was done. Six months (fig9) and one year follow up (fig.10) examination reveals asymptomatic tooth, adequately functional tooth and satisfactory periapical healing.

Figure 1: Pre operative

Figure 2: Working Length 11

Figure 3: Master Cone 11

Figure 4: MTA Apexification 11

Figure 5: Guttapercha obturation 11

Figure 6: Working Length 21

Figure 7: Master cone selection 21

Figure 8: Guttaflow obturation 21

Figure 9: Sixth month follow up

Figure 10: One year follow up

DISCUSSION

The reciprocal activity between the newly formed granular tissue and dentinoclasts initiates and progresses the resorption process inside the endodontic space which could be compared to pathogenetic changes in the periapical region. The early diagnosis and therapy is very important in order to stop the resorption process. The success or failure of therapy should be followed clinically and by radiographic control. Naturally, if the resorption is stopped actually is not progressing, we believe that our treatment is successful. We saved a tooth and the objective of our therapy has been accomplished.[4] The outcome of treatment of teeth with internal root resorption depends primarily on the size of the lesion. Large lesions cause a reduction in the resistance of the tooth to shear forces that may lead to tooth fracture.[7] In this case guttaflow obturation material was used for obturation. The advantages of gutta flow material is having good flow property, low solubility and tight seal of the root canal due to its slight expansion. Hence, no forces exerted on the weakened tooth structure as in comparison to thermo mechanical or cold lateral compaction. Three dimensional sealing of the root canal is one of the principle goals of endodontic treatment and is essential for preventing apical and coronal leakage in the root canal system. In this case it becomes difficult to achieve this goal due to the lack of an exact apical stop and unsatisfactory obturation of the root canal system. 2%

chlorhexidine was used as an irrigant, since it is proved to be more effective against Enterococcus fecalis than sodium hypochlorite. Chlorhexidine is relatively non-toxic and does not dissolve tissue. Since the cases presented in this article had root resorption, sodium hypochlorite was not used as it can easily flow beyond the apex and may cause irritation of the periradicular tissues. The antibacterial mechanism of chlorhexidine is related to its cationic bisbigunide molecular structure. The cationic molecule is absorbed on the negatively charged cell membrane and cause leakage of intracellular components. Chlorhexidine also increases the ph of dentine, and therefore inhibits the activity of osteoclastic acid hydrolases in the periodontal tissues and activates alkaline phophatses. Moreover chlorhexidine if applied to dentin binds effectively to hydroxapatite, providing a lasting reservoir of chlorhexidine after the completion of treatment.[10] Apexification treatment is supposed to create an environment to permit deposition of cementum, bone and periodontal ligament to continue its function of root development. A new bioactive material such as MTA (Mineral trioxide aggregate) used as an apical barrier. Investigation shown that it can conduct and induct apical hard tissue formation. MTA was used for apexification. Advantages of MTA are biocompatible to the periradicular tissues, activates alkaline phosphateses, good sealing ability, formation of osteoid like material, low cytotoxycity, longer working time and set in the presence of moisture.[12] In both the cases successful outcome has been seen following non surgical root canal therapy with interappointment intracanal medicament of calcium hydroxide and 2% chlorhexidine as an vehicle for calcium hydroxide. Complete disinfection of the root canal system is key to success in treatment of external inflammatory resorption.

CONCLUSION

Despite the serious damage to the root by external and internal root resorption. Non-surgical pulp space therapy arrested the root resorption and regenerated the periapical tissues.

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