

Case Report:

Management of Internal resorption: Case report

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Abstract:

Internal resorption is relatively a rare resorption in which resorption begins in the root canal and destroys surrounding dental hard tissues. It is caused by transformation of normal pulp tissue into granulomatous tissue by giant cells, which resorb dentin. Other contributory factors like trauma, caries, restorative procedures and idiopathic dystrophic change within the pulp are also suggested. Internal resorption can be found in all areas of the root canal but is most commonly found in the cervical region. Diagnosis of internal resorption starts with simple clinical evaluation to advanced digital radiographic techniques, ultimate diagnosis is determined by histologically identifying osteoclastic activity. Once internal resorption is identified, various treatment modalities can be implemented to preserve the tooth like nonsurgical root canal treatment, recalcification, remineralization with calcium hydroxide preparation, and surgical approach to seal the resorption. The purpose of this article is to report 2 different cases of internal resorption and their management using thermoplasticized gutta percha obturation technique.

Keywords: Internal resorption, odontoblasts, thermoplasticized gutta percha

Introduction:

Tooth resorption is a state correlated with either a physiological or a pathological process resulting in loss of dentin, cementum or bone ^[1, 2].

Root resorption is broadly classified into external and internal resorption by the location of the resorption in relation to the root surface ^[3, 4]. Andreasen has classified tooth resorption following dental trauma and his original classification remains the most widely accepted ^[5].

Tooth Resorption Classification:

- Internal
 - Inflammatory
 - Replacement
- External
 - Surface
 - Inflammatory
 - Replacement

The occurrence of internal resorption has been estimated to be between 0.01% and 1% ^[6]. One study concluded internal root resorption in 1 out of 1,000 teeth ^[7]. The condition is more commonly observed in male than female subjects ^[8, 9]. The most commonly affected teeth reported were maxillary incisors ^[9]. Apical internal resorption is consistently associated with apical inflammatory external resorption of the cementum from partially resorbed root apices ^[10, 11].

Internal inflammatory resorption is relatively more destructive and results in loss of tooth structure devoid of the deposition of any hard tissue. It is most frequently found in the cervical region ^[11], and clinically presents asymptotically. Usually the coronal pulp is necrotic and apical pulp is vital. The resorptive defect generates a clinically noticeable pinkish color in the tooth crown because

of the extremely vascular resorptive tissue which becomes observable through the slim remaining enamel^[1, 2]. Internal resorption is considered to be an inflammatory process results by an insult to pulp which causes focal necrosis of the odontoblasts and a chronic inflammatory process without pulp necrosis^[12, 13]. Internal resorption takes place in the surface of the dentin walls that form the pulp cavity and are not as common as the external resorption.

In the brief, inflammatory resorption, there are odontoblasts compromising the predentin. When the resorption commences the pulp is living, on the other hand distorted by a chronic dental pulp inflammation of long duration. The break in continuity of the odontoblastic layer and the compromise of the predentin expose the dentin and set up an autoimmune reaction, sustained by a chronic pulp inflammation^[12].

Thus, the endurance situations become more and more complex and the pulp necrosis sets in motion starting from its coronal third^[14]. The microorganisms can be there since the commencement of the inflammatory procedure or accessing the pulp when the necrosis starts; like this they would be liable for the succession of the destructive process^[12]. When the pulp is completely necrotic, the resorption ends. One study concludes that when the necrosis is present; generally the communication of the pulp cavity exists with the periodontium in the resorption vicinity^[15].

The judgment of resorption into internal and external resorption is usually based on clinico-radiographic finding. Histology of the involved area discloses multinucleated giant cells, osteoclasts, odontoblasts and a cascade of numerous other enzymes. Internal resorption can be treated if diagnosed in early stages^[16, 17]. Clinically internal resorption may be wrongly identified as invasive cervical resorption which is ruled out by a

surface defect while probing the crown. When there is internal resorption, the x-ray shows an enlargement of the root canal, in a manner that the lines which define the walls of the canal disappear. The x ray that identifies the external resorption demonstrates an area of bone rarefaction associated with the dental alteration, while the internal resorption is restricted to the tooth, except when it is communicating the periodontium. That differential diagnosis is important with regard to the clinical behavior^[9, 18].

Radio graphically the lesion presents as a circumscribed; oval enlargement which is uninterrupted with the root canal wall and finally leads to distortion of the canal outline^[19].

In root canal replacement resorption, etiology is unidentified that is why it is identified as idiopathic internal resorption. Many responsible predisposing factors are traumatic luxative injuries, orthodontic tooth movement, tooth bleaching, chronic inflammation of the pulp and periodontal tissue, as well as extreme heat production while cutting dentin^[16]. One more aspect to be measured in the differential diagnosis is the use of periapical radiographs in two different angles. The internal defect accompanies the illustration in all of the angulations and the resorption expresses will be likely to stand back from the canal when we change the angle. The management of the internal resorption is the taking away of the pulp tissue that protects the responsible cells for the process^[20, 21, 14].

The trouble is cleaning and filling the distorted area due to resorption^[12, 22, 23]. Tissue loss can be extensive and often not restorable. After taking into account the differential diagnosis, including external root resorption, treatment ought to plan at absolute removal of the resorptive tissue from the root canal system, in an attempt to prevent further loss of hard tissue. However, choosing proper

restorative materials for these cases remain a challenge, above all if tooth loss is extensive; extraction is the merely sensible alternative in several cases. This case report describes the 6 month follow up of internal inflammatory root resorption in a maxillary central incisor and mandibular central incisor.

Case 1

A female patient with non contributory medical history came to Govt. Dental College, Ahmedabad with complain of discolored tooth. She gave a history of trauma 4 years back. On inspection teeth #21 and #11 were discolored. No intra-oral or extra-oral swelling was seen. Both the teeth were mild tender to percussion and failed to respond to cold and electric pulp sensitivity testing. No periodontal pocket was present. On intra-oral periapical (IOPA) view of tooth #21, round radiolucent defect was seen at the mid-root level along with periapical radiolucency [fig. 1]. Defect seems to be confined to the tooth and do not appear to communicate to lateral periodontium using different radiographic angulations. Radiograph also shows radiolucency in periapical area of tooth #11. Diagnosis which was established of internal resorption, pulpal necrosis and chronic periapical abscess in tooth #21. And chronic periapical abscess was diagnosed in relation to tooth #11.

Because of owing to the favorable periodontal condition, conservation of teeth #21 and #11 were considered through root canal treatment. Root canal treatment was achieved by established methods. After coronal access with no. #2 round bur, the pulp tissue was eradicated. Working length was taken using radiograph and apex locator (Root ZX II, J. Morita) [fig. 2]. After working length determination, the canal was prepared by the crown down method. Master apical file size was ISO 60 considered. Copious irrigation with accomplished with 3% sodium hypochlorite

20 ml and a calcium hydroxide paste dressing was placed to alkalinize the resorbed defect, remove remaining pulp tissue and control bleeding at the perforation [fig. 3]. After 3 months, the calcium hydroxide dressing material was removed with normal saline (0.9% w/v) and 3% sodium hypochlorite irrigation. The root canal was irrigated with a 3-min rinse with a buffered solution EDTA of pH 7.4 under instrument agitation. The internal portion of resorbed space was filled with thermo plasticized carrier based gutta percha (Thermaflo, Equinox) [fig. 4]. Finally, the coronal chamber was restored with light cured fine particle micro hybrid composite (Tetric n Ceram, Ivoclar Vivadent). A postoperative radiograph was taken confirming satisfactory filling of the root canal and resorptive defect. Clinical and radiographic follow-up was conducted for 6 months, showing a functional tooth with no endodontic pathology [fig. 5].

Case 2

A 24-year-old female patient was referred to the Department of Endodontics, Govt. Dental College, Ahmedabad for dental treatment. The patient was complaining for pain in relation to lower front teeth. The patient reported history of dental trauma 1 year back and previous dental treatment 6 month back. On inspection tooth # 31, #41 had some restoration, tooth #31 was discolored. There was no obvious intra-oral or extra-oral swelling present. On palpation tenderness was present in vestibular region. Both the teeth were tender on percussion and failed to respond to cold and electrical pulp sensitivity testing, there was no deep periodontal pocket present. The radiographic assessment revealed a well-defined radiolucent area in middle third of the tooth #41 and slight in apical third of the root canal of tooth #31 with apical radiolucency in both the teeth. Radiolucent area in tooth #41 was not seen to communicate to lateral periodontium

[fig. 6]. Diagnosis of internal resorption and chronic periapical abscess was established.

The patient was adequately notified about the status of his teeth, as well as the proposed retreatment. The treatment of the dental resorption suggested that an endodontic treatment associated with warm gutta-percha technique. After access opening with round bur no # 1 and 2 working length was established. Working length was established with radiographic method [fig. 7]. The biomechanical preparation with crown down method was completed to expand the root canal in the cervical segment up to the resorption area in order to allow an adequate cleaning of the referred area. A sodium hypochlorite solution highly concentrated (3%) 20 ml was used with the reason of dissolving the necrotic tissues of the defect in the resorption area. Consequently, the temporary dressing of intracanal medication with calcium hydroxide, for the period of 3 months was given. Crown was sealed with intermediate restorative material (IRM, Caulk/Dentsply, Rio de Janeiro). After that period, the root canal obturation with thermo plasticized carrier based gutta-percha was performed (ThermaFlo, Equinox) [fig. 8]. The access cavity was sealed with light cured composite resin. Radiographic image taken after the root canal filling demonstrated the sealing of the intracanal resorption. A 6 month postoperative radiograph demonstrated a clinically significant healing of the previous periapical radiolucency [fig. 9].

Discussion

Internal inflammatory root resorption is a pathological process, initiated within the pulp space and associated with loss of dentine. It is often described as an oval shaped enlargement of the root canal space and is usually asymptomatic and detectable by radiographs. When diagnosed, immediate removal of the causative agent must be

considered, aiming to arrest the cellular activity responsible for the resorptive activity^[24,25].

Internal resorption is a usually asymptomatic the patient reported with esthetic reasons having pink discoloration due to intrapulpal hemorrhage, leading to red capillary granulations reflecting through the enamel as pink spots^[1, 2]. Patient complained of discolored tooth in one case and in another case history of trauma and complains of pain. Pulpal involvement is the reason for endodontic treatment. The options available for treatment were either endodontic treatment followed by crown or the extraction of teeth with replacement by an implant or prosthesis – fixed or removable. In this case the patient opted for non extraction regimen.

The endodontic treatment of teeth with internal root resorption is complicated due to the complexity in removing the tissue of the resorption cavity. However, the soft tissue can be dissolved by the use of sodium hypochlorite in elevated concentrations followed by the use of intracanal medication with calcium hydroxide. The complicatedness in cleaning the concavity resorption area demands a cleaning with chemical substances that have an appropriate organic solvent ability^[26]. The endodontic instrumentation of that resorption area can results in communication with the periodontium that could cause difficulties in the prognosis. Balancing the effect of the sodium hypochlorite, we used the intracanal medication with calcium hydroxide for a prolonged period^[12, 23].

The primary aim of root canal treatment is to disinfect the root canal system followed by obturation of the canal with an appropriate root-filling material to prevent it from reinfection. Internal root resorption defects can be difficult to obturate sufficiently. To completely close the resorptive defect, the obturation material should be

flowable. Despite of recent advances in endodontic techniques, instruments and irrigants are found to be unsuccessful to access the restricted areas of the canal space^[27-30]. The use of ultrasonic is to agitate the irrigant to improve the removal of necrotic debris and biofilms from inaccessible areas of the root canal^[31].

Irrigation by concentrated sodium hypochlorite will in some cases help to decrease the bleeding and disinfect and clean the area as experienced with accidental perforation complications. Studies on the success of sodium hypochlorite and calcium hydroxide to remove the resorptive and other tissues from the root canal indicate that they have an additive or even synergistic effect^[32-37]. Irrigation with 3% NaOCl (sodium hypochlorite) the granular tissue is mechanically and chemically taken out due to the organolytic effect of NaOCl. The use of calcium hydroxide also has two significant goals: to control bleeding, and to necrotize residual pulp tissue and to make the necrotic tissue more soluble to sodium hypochlorite. Because of the limited access by instruments to all areas of the resorption cavity, chemical means are needed to completely clean the canal. The soft tissue can be dissolved by the use of sodium hypochlorite in high concentrations followed by the application of intracanal medication with calcium hydroxide. Research shows that the thermoplastic gutta-percha techniques were significantly better in filling artificial resorptive cavities than core systems and cold lateral condensation (CLC). The cold lateral compaction technique produced slightly fewer voids but a larger proportion of the canal space was filled with sealer with this technique.

ThermaFlo by equinox is a simple, fast and effective carrier based heated Gutta Percha Obturation System. The Smooth insertion of single heated obturator assures a predictable three

dimensional hermetic seal in the apical, middle and coronal third of even the most complex canal anatomies. Cases of internal resorption demand immediate and definitive treatment, so that the prognosis does not suffer. Different approaches have been suggested by several authors. The aim should be debridement and restoration of the resorptive defect by placement of a suitable medicament so that the tooth remains healthy and aesthetically retained. When multiple teeth are involved resorption does not necessarily occur at the same rate^[38]. Separate lesions can begin times apart and progress at a different pace. The amount of tooth structure loss is of paramount importance and early diagnosis is vital.

The necessary endodontic treatment of the concerned tooth was provided and follow up of three to six months was scheduled to rule out any recurrence. The treatment and prognosis both depend on the stage of the defect^[39]. When considering a prognosis for a tooth with internal root resorption, endodontically treated, the call for radiographic vigilance every six months for at least two years should be considered. In the above given case the tooth is symptom less but a longer record (3-4 years) is required to rule out any reappearance of the lesion. There may be chances that the area of resorption to present a lateral canal, which would allow the continuity of the resorption process and compromise the treatment process^[12]. The prognosis depends upon the location of the lesion (supra osseous or infra osseous), the time elapsed since resorptive defect started, contamination of site, bone loss at site and choice of sealer used. The motto in the cases was to prevent additional resorption.

Conclusion

The clinical case depicts that the endodontic treatment instituted in agreement with the suitable protocol in the relevant text permits the clinical

resolution of internal root resorption. After 6 month follow up it shows good results and patient was asymptomatic.

CASE 1



Fig 1: Pre-operative X-ray



Fig 2: Working Length



Fig 3: Ca(OH)₂ Dressing



Fig 4: Post-operative X-ray



Fig 5: 6 Month Follow Up

CASE 2



Fig 6: Pre-operative X-ray



Fig 7: Working Length



Fig 8: Post-operative



Fig 9: 6 Month Follow Up

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