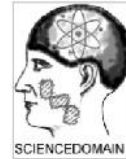




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Internal Resorption: A Report of Two Cases

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Authors' contributions

This work was carried out in collaboration between all authors. Author DA wrote the draft of the manuscript. Authors DA and DJS managed the literature searches. Author DA designed the figures. Authors DA, DJS, SPT and UPS contributed to the correction of the draft. Author DA did the cases, provided the figures and author DJS supervised the work. All authors read and approved the final manuscript.

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Case Study

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ABSTRACT

Internal resorption is generally noted in teeth with previous history of trauma. Often the tooth is asymptomatic. The diagnosis of this condition at an early stage improves the prognosis of such teeth. Therefore it is important for the dental fraternity to have adequate knowledge of this condition including its aetiology, clinical manifestation, radiographic interpretation and management. This case report describes two such resorptive defects which were treated non- surgically with thermoplasticized gutta-percha technique.

Keywords: Internal resorption; pink tooth; thermafil.

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1. INTRODUCTION

Resorption is a condition associated with either a physiologic or a pathologic process resulting in the loss of dentin, cementum, and/or bone [1]. Internal resorption is a rare pathologic phenomenon, initiated within the pulpal space, due to an inflammatory process, leading to resorption of dentin/cementum [1,2,3]. The occurrence of internal resorption has been estimated to be in between 0.01% to 1% [4]. It can be broadly classified into two types: i) Internal root canal inflammatory resorption, ii) Internal root canal replacement resorption wherein there is a concomitant deposition of bone like tissue in some regions of the defect [5]. The patient is usually asymptomatic. The normal pulp tissue is transformed into granulation tissue, exhibiting high vascularity and varying degrees of inflammation, along with multinucleated giant/clastic cells present adjacent to the granulation tissue. Patient may experience pain due to exposure of granulation tissue to oral fluids. Clinically, the lesion manifests itself as a “pink spot” thereby termed as “pink tooth of Mummy”, after the anatomist, James Howard Mummy [6]. The pink colour is related to the highly vascularized connective tissue adjacent to the resorbing cells. This colour transforms to grey/ dark grey when the pulp becomes necrotic [7]. Internal resorption is characterized by the presence of necrotic pulp coronally and vital pulpal tissue apically below the resorptive defect. This produces a positive response to vitality tests; until the lesion grows significantly in size resulting in perforation. A negative sensitivity test, therefore, does not rule out active internal resorption. With due course, the pulp can become non vital, also resulting in a negative response [8]. The etiological factors responsible for internal resorption are: trauma, caries, restorative procedures and idiopathic dystrophic changes [9]. The root resorption occurs in two phases: injury and stimulation. Infection/microbial injury act a major stimulatory and progressive factor for internal root resorption [10]. The extent of resorptive process is determined by the intensity of the stimuli and the degree of inflammation. The vascular changes in the pulp alter the oxygen tension, producing a shift in the pH to acidic, thereby steering the resorptive process. If left untreated for a long time, internal resorption can progress into an external perforation, further resulting in the fracture of the tooth [11]. The diagnosis of these lesions is difficult to establish as they are not detectable on radiographs at their early stages [3]. On

radiographic examination, the lesion usually appears as round to oval, uniform radiolucent enlargement of the pulp space. The outline of the root canal is generally distorted [12]. The only treatment modality is the removal of the inflammatory pulp in the vital tooth followed by its obturation. The reciprocal activity between the newly formed granulation tissue and dentinoclasts initiates and progresses the resorption process. The clastic precursor cells (monocytes) are recruited via the blood vessels, therefore, controlling the process of internal root resorption is theoretically easy, with conventional root canal therapy. The success of endodontic treatment oscillates around many factors. The presence of organic debris and microorganisms in the irregular resorptive areas may interfere with the prognosis. Another problem encountered in such cases is the fact that the complete extent of the defect cannot be determined clinically or radiographically thus making obturation of these cases tougher [13]. The size of the resorptive lesion is the primary determinant for the treatment outcome of these teeth. A significant reduction in the resistance of tooth to shear forces is noted in case of large lesions which may in turn cause the tooth to fracture, thereby making it imperative to initiate early endodontic treatment [14]. Early detection is essential for the appropriate management of internal resorption, to prevent further weakening of remaining tooth structure and root perforations. This case report describes successful management of two resorptive defects in which the granulation tissue was removed, canal debrided and obturated with thermoplasticized gutta- percha technique.

2. CASE REPORT

2.1 Case 1

A 21 year old male reported to the outpatient department of Kothiwal Dental College and Research Centre with the chief complaint of pain and sensitivity in lower front teeth region since 1 month. The pain was mild, intermittent and aggravated on taking hot and cold fluids. The patient elicited delayed response to thermal and electrical vitality testing.

Clinical examination presented a pink coloured discoloration in respect to cervical region of lower right central incisor (41) (Fig. 1). It was soft on probing and removable on excavation.

On radiographic examination (Fig. 2), a circular radiolucency was seen in continuation with coronal limit of the root canal.

Based on clinical and radiographic findings, a diagnosis of internal resorption was made i.r.t 41 and root canal therapy planned.



Fig. 1. Intraoral photograph showing "pink" discoloration i.r.t. 41

2.2 Case 2

A 62 year old female came to the outpatient department of Kothiwal Dental College and Research Centre with the chief complaint of food lodgement in upper front tooth region since 2 years. Patient gave a history of trauma five to six years back in the same tooth region for which she had undergone treatment two years back.

Clinical examination revealed an exposed pulp chamber in relation to maxillary right central incisor [11]. There was food and debris lodgement in the cavity. Vitality test was not indicated in this case as the pulp chamber was already open.

On radiographic examination, a balloon shaped radiolucency was noted at the most coronal aspect of root canal (Fig. 3).



Fig. 2. Pre- operative radiograph (case1)

Based on clinical and radiographic findings, the diagnosis of internal resorption was made i.r.t 11.

2.3 Treatment of Cases 1 and 2

Root canal therapy was performed for both cases, under local anaesthesia (2% Lignocaine with 1:100000 epinephrine) and rubber dam isolation. The soft granulation tissue on the cervical aspect of 41 of case 1 was excavated; and the cavity was modified using a no. 4 round bur. For both the cases, access was gained into the pulp chamber. Canal orifice was located and patency was ascertained using a small size K-file (Kerr, Orange, California). Working length was established using an apex locator (Root ZX, J. Morita Inc.) and measured on the radiograph. The working length was found to be 18mm in case 1 and 22.5mm in case 2. The canal was cleaned and shaped with hand K-files (Dentsply, Maillefer, Switzerland). The canal was sequentially irrigated using 5.25% Sodium hypochlorite and 17% EDTA during the cleaning and shaping procedure. Calcium hydroxide (Calcicur, VOCO, Germany) was placed as an intracanal medicament for cavity disinfection and the cavity temporized with Cavit (Cavit; 3M ESPE, Seefeld, Germany). In the second appointment after ten days, the patients were found to be asymptomatic and canals were thoroughly cleaned of the medicament and dried with absorbent points. Obturation was done using Thermafil (Dentsply, Maillefer, Switzerland) and AH Plus sealer (Dentsply, Maillefer, Switzerland) (Figs. 4, 5).



Fig. 3. Pre- operative radiograph (case 2)

The post-endodontic permanent restoration was completed with composite (Filtek Z 350; 3M ESPE Dental Products, St Paul, MN). The cervical defect in Case 1 was filled with a “fourth generation” dentin bonding system (Optibond FL, Kerr) following the manufacturer’s instructions, and the lesion was restored with

composite (Filtek Z 350; 3M ESPE Dental Products, St Paul, MN). Clinical and radiographic follow up was done for both the patients after one month, six months and one year post operatively. Both the patients were found to be asymptomatic with uneventful healing (Figs. 6, 8, 10 for case 1 and Figs. 7, 9, 11 for case 2).



Fig. 4. Post obturation radiograph (case 1)



Fig. 5. Post obturation radiograph (case 2)



Fig. 6. 1 month follow up (case 1)



Fig. 7. 1 month follow up (case 2)

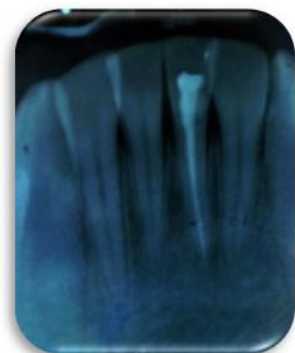


Fig. 8. 6 months follow up (case 1)



Fig. 9. 6 months follow up (case 2)



Fig. 10. 1 year follow up (case 1)



Fig. 11. 1 year follow up (case 2)

3. DISCUSSION

Internal resorption can progress to a great extent due to its insidious pathology. These lesions are relatively asymptomatic and many of which are diagnosed incidentally on routine radiographic examinations. Angled radiographs and Cone Beam Computed Tomography are useful in detecting internal resorption at an early stage.

The treatment of choice for internal root resorption standardizes on root canal therapy as it effectively removes the granulation tissue and the blood supply to the clastic cells. Foremost, the access cavity must be conservative and should aim to preserve as much tooth structure as possible so as to avoid further weakening of the already compromised tooth [15].

Various treatment options may be considered depending upon the size of the resorptive cavity and the progress of the lesion: i) Therapeutic abstinence and monitoring, in absence of infectious signs and symptoms, ii) Orthograde root canal treatment, with three options depending on the absence or presence of perforation of the radicular wall: complete root canal; filling with guttapercha on non-perforated lesions; combined guttapercha and Mineral Trioxide Aggregate (MTA) fillings for perforated canals; complete filling with a bioactive material (MTA or Biodentin) on apical perforated lesions located in short root length; iii) Retrograde apical treatment; iv) Extraction and replacement by implants: non-conservative treatment is indicated if the tooth is too weakened to be treated or restored [3].

Emphasis must be placed on the chemical dissolution of the vital and necrotic pulp tissue

with copious amount of sodium hypochlorite. Inter-appointment dressing of calcium hydroxide maximises the effect of disinfection procedures, aids in controlling the bleeding and necrotizes the residual pulp tissue [4].

Internal root resorption defects are difficult to obturate adequately [15]. Obturation can be achieved by a variety of techniques including hot vertically condensed gutta-percha and Obtura-delivered hot gutta-percha. The root canal filling material needs to be flowable so as to seal the resorptive defect completely. Thermo plasticized guttapercha has proved to be efficient in the obturation of c-shaped canals, internal resorption cavities, accessory canals and arborized foramina [16]. It demonstrates excellent flowability and eases out around curves and canal irregularities, providing greater density of gutta-percha at the apical portion of the filling [17]. Thermafil produces a homogenous three dimensional obturation allowing simple, fast and predictable fillings of root canals [18]. In case of root canal wall perforation, MTA is the material of choice being bioactive and biocompatible [19].

Gutmann et al. [20] compared lateral compaction with Thermafil obturation radiographically and concluded that Thermafil obturation technique resulted in a denser and well adapted root canal fill throughout the entire canal. Gencoglu et al. [21] advocated that warm gutta techniques fill artificially created resorption cavities significantly better than the other guttapercha techniques. Qureshi et al. [22] in his study found Thermafil to have shown better replication of root surfaces, flowability into accessory canals and had fewer voids. Considering its excellent characteristics along with its economical aspect, we adopted Thermafil obturation technique in our patients as

compared to other advanced thermoplasticized obturating systems (Obutura II, J S Quick- Fill).

However, a contradiction to Thermafil obturator was put forth by Goldberg et al. [23], Agarwal et al. [13] and Keles et al. [24] that this technique does not fill resorptive cavities adequately. Thermafil obturation technique proved to be efficient in the treatment of our cases and can be considered for the successful and economical management of cases of early internal resorption without perforation.

4. CONCLUSION

Internal resorption can be diagnosed by clinical and radiographic examination of teeth in daily practise. Modern endodontic techniques including various means of chemo-mechanical preparation and thermoplastic obturating techniques should be used during the root canal treatment of internally resorbed teeth. Nowadays, with bioactive materials being readily available, prognosis of teeth with root perforation is good. An astute clinician should diagnose this condition correctly and initiate endodontic treatment at an early stage in order to prevent root or cervical crown fracture.

CONSENT

All authors declare that 'written informed consent was obtained from the patient (or other approved parties) for publication of this paper and accompanying images.

ETHICAL APPROVAL

All authors hereby declare that all experiments have been examined and approved by the appropriate ethics committee of the institution and have therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. American Association of Endodontists. Glossary of endodontic terms; 2012. Available: <http://www.aae.org/glossary/>
2. Emre Altindasar, Becen Demir. Management of a perforating internal resorptive defect with mineral trioxide aggregate: A case report. J Endod. 2009; 35:1441.
3. Elisabeth Nilsson, Eric Bonte, François Bayet, Jean-Jacques Lasfargues. Management of internal root resorption on permanent teeth. Int J Dent. 2013;1-7.
4. Haapasalo M, Endal U. Internal inflammatory root resorption: The unknown resorption of the tooth. Endod Topics. 2006;14:60–79.
5. Ne RF, Witherspoon DE, Gutmann JL. Tooth resorption. Quint Int. 1999;30(1):9–25.
6. Shaefer, Hine, Levy. Shaefer's textbook of oral pathology. 5th edition. Elsevier Publication; 2008.
7. Silveira FF, Nunes E, Soares JA, Ferreira CL, Rotstein I. Double "pink tooth" associated with extensive internal rootresorption after orthodontic treatment: a case report. Dental Traumatology. 2009; 25(3):e43–e47.
8. Martin Trope. Root resorption due to dental trauma. Endod Topics. 2002;1:79–100.
9. Rahul Maria, Vijay Mantri, Shraddha Koolwal. Internal resorption: A review and case report. Endodontology. 2010;22: 100-8.
10. Fuss Z, Tsesis I, Lin S. Root resorption—diagnosis, classification and treatment choices based on stimulation factors. Dent Traumatol. 2003;19(4):175–82.
11. Nagaraj E, Kaur RP, Raghuram PH, Kumar PS. Multiple internal resorption in permanent teeth associated with hyperparathyroidism. Indian J Dent Res. 2013;24:128-31.
12. Maarte Meire, Roeland De Moor. Mineral trioxide aggregate repair of a perforating internal resorption in mandibular molar. J Endod. 2008;34:220.
13. Agarwal M, Rajkumar K, Lakshminarayanan L. Obturation of internal resorption cavities with 4 different techniques: An *in-vitro* comparative study. Endodontology. 2002;14:3-8.

14. David Keinan, Illan Heling, et al. Rapidly progressive internal root resorption: A case report. *Dent Traumatol.* 2008;24:546.
15. Patel S, Ricucci D, Durak C, Tay F. Internal root resorption: A review. *J Endod.* 2010;36(7):1107–21.
16. Chokkalingam M, Ramprabha, Kandaswamy D. Three dimensional helical computed tomographic evaluation of three obturation techniques: *In vitro* study. *J Conserv Dent.* 2011;14:273-76.
17. Chu CH, Lo ECM, Cheung GSP. Outcome of root canal treatment using thermafil and cold lateral condensation filling techniques. *International Endod J.* 2005;38(3):179-185.
18. Cohen S, Burns RC. Obturation of the cleaned and shaped root canal system. *Pathways of the pulp.* United states of America: John Schefer. 2010;349-88.
19. Main C, Mirzayan N, Shabahang S, Torabinejad M. Repair of root perforations using mineral trioxide aggregate: A long-term study. *J Endod.* 2004;30(2):80–3.
20. Gutmann JL, Saunders WP, Saunders EM, Nguyen L. An assessment of the plastic Thermafilobturation technique. Part 2. Material adaptation and sealability. *Int Endod J.* 1993;26:179-83.
21. Gencoglu N, Yildirim T, Garip Y, Karagenc B, Yilmaz H. Effectiveness of different gutta- percha techniques when filling experimental internal resorptive cavities. *Int Endod J.* 2008;41:836-42.
22. Qureshi B, Munir B, Akbar I. A comparison of Thermafil and lateral condensation techniques in obturation of root canal systems. *Pakistan Oral & Dental Journal.* 2012;32(3):531-34.
23. Goldberg F, Massone EJ, Esmoris M, Alfie D. Comparison of different techniques for obturating experimental internal resorptive cavities. *Endod Dent Traumatol.* 2000;16: 116–21.
24. Keles A, Ahmetoglu F, Uzun I. Quality of different gutta-percha techniques when filling experimental internal resorptive cavities: A micro-computed tomography study. *Aust Endod J.* 2014; 40(3):131-5.

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