TREATMENT OF INFLAMMATORY INTERNAL ROOT RESORPTION WITH BIODENTINE: A CASE REPORT

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ABSTRACT

Internal root resorption has been described as a resorptive defect of the internal aspect of the root following necrosis of odontoblasts as a result of chronic inflammation and bacterial invasion of the pulp tissue. Successful treatment outcome depends on early diagnosis, removal of the cause, proper treatment of the resorbed root. The present case report demonstrates the use of biodentine for the management of internal resorption.he aim of this study was to evaluate the efficacy of different lengths of time of passive ultrasonic irrigation (PUI) in removing calcium hydroxide (CH) paste from root canal, using scanning electron microscopy and energy dispersive spectrometry (SEM/EDS).

KEYWORDS: biodentine, internal root resorption, therapeutic measures
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INTRODUCTION

Internal root resorption has been described as a resorptive defect of the internal aspect of the root following necrosis of odontoblasts as a result of chronic inflammation and bacterial invasion of the pulp tissue. It is caused by transformation of normal pulp tissue into granulomatous tissue with giant cells, which resorb dentin[1].

As far as resorption is concerned, it occurs in two stages: First is inorganic mineral structure degradation and second is organic matrix disintegration. Progressive loss of dentin can be observed in internal inflammatory kind of resorption while in root canal replacement type of resorption, consequential deposition of hard tissue resembling bone or cementum can be observed but not the dentin. Further internal inflammatory resorption can be classified as perforating or non-perforating types[2].

Causes may include Herpes zoster Virus, trauma, internal bleaching and excessive heat application during cavity preparation[3].

Most of the time, routine dental radiographic examinations reveal internal resorption, as it asymptomatic and are discovered purely by chance. Sometimes during clinical examination internal resorption can be diagnosed as pink spot as clinical sign on the crown. In internal resorption loss of dental tissues are usually extensive and beyond restorations[4].

Various means to detect internal resorption are: a) visual examination, the basis for which is color change of the crown b) radiographic examination and diagnosis, c) three dimensional imaging

in the form of conventional and cone beam computed tomography, light microscopy and electron microscopy depicts these defects as circumscribed and oval in shape[5].

A range of materials are available for the therapeutic treatment of internal root resorption include glass ionomer cement, zinc oxide eugenol, amalgam alloy, composite resin, MTA, hydrophilic plastic polymer (2-hydroxyethyl methacrylate with barium salts), Super EBA, and thermoplasticized gutta-percha administered either by injecting technique or by condensation technique[2].

One newer dental material which is fully bioactive and biocompatible dentin substitute is Biodentine, which works on the principal of unique active biosilicate technology. This material is basically designed to treat the damaged parts of dentine caused during either restorative or endodontic procedures. This material has the following advantages as compared to their counterparts i) faster setting time (12) minutes ii) advanced and better mechanical properties. Biodentine can be used as a permanent dentine substitute because of its improved physico-chemical properties with advanced and enhanced biological behavior. The excellent handling properties of Biodentine coupled with favorable physical and biological properties can be utilized proficiently as a pulp capping agent and as an encouraging endodontic repair material[6].

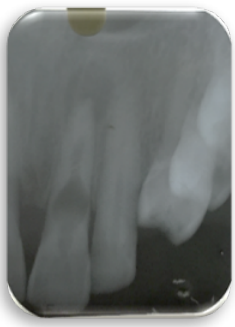
CASE REPORT

A 35-year-old female patient reported to the department of conservative dentistry and endodontics, Pacific Dental College, Udaipur, Rajasthan with a chief complaint of dull pain in upper right front tooth region since one month. There was no relevant medical and dental history.

Clinically no caries was present. The crown of 21 showed dull appearance and was tender on percussion. Pulp sensibility tests were done using electronic pulp tester (Parkell Electronic Division, USA) and cold test with a refrigerant 1, 1, 1, 2-tetrafluoro-ethane (Hygenic Endo-Ice, Coltene Whaledent). The tests revealed the non vitality of 11 and 21.

Radiographic examination showed radiolucency in middle third of root surface of the left central incisor indicating a case of internal/ external resorption and an associated radiolucency in the periapical area of same tooth [Figure 1]. Also there was widening of periodontal ligament with 11 and 21. Intraoral periapical radiographs (IOPA) were taken in different angulations using same-lingual, opposite buccal (SLOB) rule. The defect moved with change in angulation and was centered in centre of the canal, proving it was an internal resoptive defect. The diagnosis of necrotic pulp with chronic periapical abscess with 11 and internal resorption with asymptomtic apical periodontitis with 21 was made. It was decided to complete the endodontic therapy for both the teeth and to stop the resorptive defect from extending further.

Figure 1. Preoperative IOPA.



Rubber dam application was done and access opening was initiated without local anaesthesia since the teeth were non-vital. Working length radiograph was taken wrt 11 and 21. Working length was determined with RVG and was verified using electronic apex locater (Propex II, Dentsply). Biomechanical preparation of the tooth 21 was done with help of K files and Ultrasonic tips proper debridement and disinfection of the ballooned area (resorptive defect) of the canal. An intracanal dressing of calcium hydroxide paste was placed for a week. In the next visit, 7 days later the tooth was prepared till 70 no. K file.

Figure 2. Working length IOPA.

Finger pluggers (Dentsply, Maillefer) were selected corresponding to the required biomechanical preparation. Thick consistency of Biodentine was mixed and the resorptive defect was filled using vertical condensation method. The whole canal was filled with a thick mix of biodentine and post endodontic restoration was done with glass ionomer cement in tooth 21. Preparation of tooth 11 was done using step back preparation (till 70 K File) and obturation was done

with lateral compaction of guttapercha with AH plus sealer.

The patient was recalled after one year. The follow-up radiograph after one year showed peri-apical healing of both the central incisors.

Figure 3. Postobturation IOPA.

Figure 4. Postobturation IOPA: 1 year follow up.

DISCUSSION

Treatment of internal root resorption is relatively easy. Once internal root resorption is diagnosed, endodontic treatment must be performed promptly. Full instrumentation to the root apex removes the blood supply to the resorptive defect. If the resorptive defect is extensive, it is usually not possible to removeall the granulation tissue initially. Calcium hydroxide placed for a period of time breaks down the remaining granulation tissue, which can then be washed out by copious rinsing with 5.25% NaOCl[7,8].

When complete granulation tissue has been removed, the left out defect can be treated in either of three ways: a. non-surgically, b. re-calcification with the help of calcium hydroxide, c. surgically.

I. If the perforation due to the defect has not reached the periodontal ligament through root, the obturation can be completed with warm gutta percha in combination with root canal sealer.

2. If the perforation due to the defect becomes extensive and reached below the bone level through root, then there will be a need to produce a hard tissue barrier, this can be achieved with the help of calcium hydroxide treatment for long-term, followed by obturation.

3. If the perforation due to defect becomes coronal to the epithelial attachment, or an enormously large perforation is there, then the surgical approach has to be adopted to seal the perforation[9]. The most probable reasons why Biodentine have shown better results in the present case could be attributed to the facts that: (1) at the time when Biodentine contacts dentine, tag-like structures are formed along the interfacial layer called "mineral infiltration zone". This contact produces alkaline-caustic effect. Due to calcium silicate cement, the hydration products are generated which degrades collagenous components of interfacial dentine thereby improves the sealing capability of Biodentine; (2) better sealing off the interface could be because of smaller particle size of Biodentine which adapts properly to cavity surface; (3) faster setting time of Biodentine which is approximately 12 minutes helps sealing the interface quicker and prevents further leakage and tremendously lowers the possibility of bacterial contamination[10]. Moreover when Biodentine sets, it produces lesser porosity and pore volume as compared to its counterpart MTA.

CONCLUSIONS

Internal resorption is an uncommon resorption of the tooth, which starts from the root canal and destroys the surrounding tooth structure. Successful treatment outcome depends on Early diagnosis, removal of the cause, proper treatment of the resorbed root. Biodentine with its favorable biological, mechanical and physical properties can be used efficiently as demonstrated by the present report.

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