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Case Report

Salvaging a tooth with extensive invasive cervical resorption

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Introduction

Tooth resorption is a common occurrence after injury or irritation of the periodontal ligament or pulp. It results due to a complex interaction of inflammatory cells, resorbing cells and the hard tissue structures of the involved tooth; however the exact etio-pathology is not fully known.¹ Majority of cases are asymptomatic and can insidiously extend to significant dimensions before being recognized during routine radiographic or clinical examination. If untreated, it can result in tooth loss.

Dental clinicians face difficult diagnostic and treatment decisions with respect to tooth resorption. Dental caries and

other non-carious destructive processes that cause tooth substance loss such as attrition, abrasion, erosion, abfraction and demastication may confuse a clinician when trying to distinguish between tooth resorption and other conditions presenting with radiolucency in radiographs. In addition, it is not necessary that a single etiology is isolated for a particular condition; two or more may act together to initiate and promote the development of lesions. Hence, it is imperative that a detailed study of the patient's history and the clinical clues presented is carried out to eliminate the cause and halt further progress of the condition.

Resorption has been classified into various types based on the causative factors, clinical presentation and histological features. Broadly, it can be classified into two types: internal and external. External tooth resorption can be further classified into surface resorption, external inflammatory resorption, external replacement resorption, external cervical resorption, and external transient resorption. Invasive Cervical Resorption (ICR) is a relatively rare, distinct and aggressive form of external resorption. It is defined as a 'localized resorptive process that commences on the surface of the root below the epithelial attachment and the coronal aspect of the supporting alveolar process, namely the zone of connective tissue attachment'.²

Early diagnosis, mechanical and/or chemical debridement of the lesion and its restorative management are the cornerstones of successful treatment of ICR.³ Different clinical

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approaches and the use of variety of restorative materials have been suggested by several authors.^{1–4}

This case report describes a combined non surgical and surgical management of a tooth with ICR. In addition, the patient's periodontal condition and aesthetic needs were addressed.

Case report

A 20 year old male patient reported with complaints of: (a) discolouration and gaps between upper front teeth and (b) a broken upper right front tooth (Fig. 1a and b). History of traumatic injury 07 months earlier was elicited. Medical history was not significant. Intra oral examination revealed an Ellis class III fracture with blackish discolouration of 11 (maxillary right central incisor). Tooth number 21(maxillary left central incisor) was discoloured, proclined with a mesial tilt, and had a deep periodontal pocket (7 mm depth) on the disto-palatal aspect. Copious bleeding was elicited on probing and a deep crater like defect was felt in the hard tissues of the tooth. Radiographic examination showed an irregular, but well demarcated area of radiolucency in 21 extending from the cemento-enamel junction to the coronal aspect of the crown and also apically upto middle third of the root (Fig. 1c). The clinical and radiological observations were indicative of a large invasive resorptive process involving the tooth (Heithersay's clinical classification 3).⁵ The clinical diagnosis, potential risks associated with treatment, and available treatment options were discussed with the patient.

Root canal treatment (RCT) was initiated in both teeth. It was completed on 11 in two visits with an inter-appointment dressing of calcium hydroxide (Metapex, Meta Biomed Co., Ltd., Horsham, USA) for ten days. Cleaning and shaping of 21 was simultaneously carried out. Working length was determined using an electronic apex locator (Root ZX; J.Morita, Kyoto, Japan) and confirmed radiographically. Crown-down preparation using ProTaper rotary instruments (Dentsply Maillefer, Ballaigues, Switzerland) upto file size F5 and Gates Glidden Drill (Dentsply Maillefer, Ballaigues, Switzerland) was employed. Irrigation was done with 2.5% sodium hypochlorite (Hypsol, Prevest Denpro Ltd, Jammu, India) and normal saline (Ives Drug India Ltd., Indore, India). Calcium hydroxide was placed as temporary dressing between appointments.

A surgical approach was planned to curette the lesion. Scaling and root planning were done a day prior to the surgery. A full thickness mucoperiosteal flap was elevated under local anaesthesia (2% lignocaine with 1:80,000 adrenaline, Septodont, Saint Maur-des-Fosses Cedex, France) to enable complete access to the lesion located on the disto-palatal aspect of the tooth. Mechanical debridement by curettage and chemical debridement by 90% trichloroacetic acid solution (Chloritech Industries, Vadodora, India) applied with a cotton pellet was carried out. Obturation was done with F5 gutta percha (GP) single cone (Dentsply Maillefer, Ballaigues, Switzerland) and AH plus sealer (Dentsply DeTrey, Konstanz, Switzerland). The GP was then sheared off at the apical extent of the defect leaving approximately 5–6 mm intact till the apex. The defect was repaired using Mineral Trioxide Aggregate (MTA) (ProRoot MTA, Dentsply Maillefer, Ballaigues, Switzerland) (Fig. 2a). The outer root contour was maintained while restoring the defect. The flap was repositioned and sutured with 3-0 silk sutures. The sutures were removed after seven days. Recall after one month revealed satisfactory gingival healing with physiological probing depth at all areas. Both the teeth were then prepared and fitted with metal-ceramic restorations. Direct composite veneering was done on 22 (maxillary left lateral incisor) to close the gap and address the chief complaint of the patient (Fig. 2b). Subsequent follow-ups upto 03 years (Fig. 3a and b) did not reveal any recurrence and the tooth were considered healthy.

Discussion

ICR leads to loss of cementum, dentin and bone and may occur in both vital and non vital teeth. Numerous contributing factors have been identified: trauma, inflammation, tooth re-implantation, tumours, cysts, occlusal stress, impacted tooth, orthodontic movements, periodontitis, dietary habits, endocrine disturbances and systemic conditions.⁶

It is imperative that expedient diagnosis, aggressive treatment and appropriate follow-up be carried out as the lesion has the ability to destroy a tooth within weeks of its onset. The key to precise determination is the radiographic features. The lesion classically presents as an asymmetrical radiolucency with ragged/irregular margins in the cervical region. Advanced lesions might exhibit a mottled appearance. Involvement of

Fig. 1 – (a): Pre-operative photograph, (b): Measuring the gaps between anterior teeth, (c): Pre-operative radiograph.

Fig. 2 – (a): Post-operative radiograph at 01 month. The resorptive defect repaired using MTA (b): Post-operative photograph at 01 month.

adjacent alveolus results in radiographic appearance of an infra-bony pocket.²

In addition, a tactile sensation of hard mineralized tissue accompanied by a sharp, scraping sound will be felt on probing the lesion with an explorer. This feature and the appearance of knife-edge cavity borders are important in the differential diagnosis with root caries in which the lesions are soft due to proteolytic enzymatic degradation.¹

ICR is associated with inflammation of the periodontal tissues and does not have pulpal involvement until late in the process.² In the present case, the lesion had enveloped the root canal. Hence endodontic treatment was carried out. In addition, a surgical approach was planned because: (a) communication between the canal and the external root surface was evident and (b) to ensure complete debridement of the resorptive lesion.

Mechanical debridement has a high failure rate because of recurrence/persistence of resorptive tissue rate.¹ The use of Calcium hydroxide has been recommended to help dissolve residual pulp tissue inaccessible to chemo mechanical debridement, eliminate microorganisms, and inactivate toxic products.⁷ The use of 90% trichloroacetic acid is proven in

inducing coagulation necrosis of the resorptive lesions, whereas the adjacent tissues remain free of inflammation.⁸

MTA was used to repair the defect as it stimulates the propagation of human osteoblasts by offering a biologically active substrate for the cells.⁹ In contrast, other repair materials are associated with the formation of a fibrous connective tissue capsule in contact with the adjacent bone resulting in the formation of a periodontal defect.¹⁰ Another advantage of MTA is that its setting characteristics are not affected in the presence of moisture/blood.⁹ Due consideration was given to the disadvantages of using MTA: (a) it is not a hard material and (b) may promote the development of subgingival calculus.¹ However, it was preferred for its bioactive and biocompatible properties.

Ideally, regenerative periodontal surgery could have been carried out to address the bone loss. However, the patient's desire and economic condition influenced the treatment plan; his criterion was immediate improvement of aesthetics without undergoing multiple surgeries/prolonged treatment. The 3-year follow-up of the case did not reveal any recurrence of the resorptive lesion and any further loss of clinical attachment - the patient was asymptomatic and the

Fig. 3 – (a): Post-operative radiograph at 03 years recall, (b): Post-operative photograph at 03 years recall.

tooth was deemed healthy. Hence it can be inferred that our treatment was successful in halting the resorptive process and in addressing the aesthetic needs of the patient as without our clinical intervention, the whole tooth would have been engulfed by the resorptive process resulting in definite extraction.

Conflicts of interest

All authors have none to declare.

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