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Non-surgical Management of Invasive Cervical Resorption - A Case Report

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Abstract

According to the high number of articles published on invasive cervical resorption (ICR), this pathology is commonly believed to be a more frequent form of cervical resorption. External cervical resorption (ECR) is One of the least understood among various types of external resorption (ER). This type of ER has been explained by Heithersay, as invasive cervical resorption (ICR), which tends to describe its invasive and aggressive nature. Other terms used to describe ICR include odontoclast Oma, peripheral cervical resorption, extra canal invasive resorption, supraosseous extra canal invasive resorption, peripheral inflammatory root resorption, and sub epithelial external root resorption. This article proposes a case report of ICR and its management. The prominent features were a substantial cervical resorptive defect with localized fibrous ingrowth located on the cervicolabial aspect of the maxillary canine involving the enamel and dentin and pulp.

Keywords: Fibrous in-growth, Odontoclast Oma;, Supraosseous.

Introduction

Root resorption is a rare condition which occurs due to a physiological or pathological process that leads to loss of tissue material such as dentin, cementum, or alveolar bone (1). It is a process of removal of cementum and/or dentin through physiologic or pathologic activity of tooth resorbing cells, which may be called Dentoclasts (2). The etiology of root resorption requires two phases:

injury and Stimulation. Any Damage to the nonmineralized structure covering the outer root surface; the pre-cementum or the unmineralized structure covering the inner root surface; the predentin. Various etiological factors including acute trauma, parafunctional habit, surgical procedures, excessive pressure due to an impacted tooth, tumour, orthodontic treatment can lead to pathological root resorption. Other factors include chemical irritation from hydrogen peroxide during dental procedures like intra-coronal bleaching. Destruction of the protective covering of cementum on outer surface, predentin or the odontoblast layer on the internal surface, which allows clastic cells from the circulatory system access to the dentin (3).

According to surface involve it is classified as: Internal resorption (IR) and External resorption (ER). According to its clinical and histological manifestation by Ne et al, external root resorption (ERR) is classified as 1. External surface resorption 2. External inflammatory root resorption a) cervical resorption with or without a vital pulp (invasive cervical root resorption) b) External apical root resorption (EARR) 3. Replacement resorption 4. Ankylosis (4).

The exact cause of ECR is poorly understood. External Tooth resorption may take place by following ways: 1. Destruction of cement oblasts from external surface of a root by leaving periodontal structures alive, with varying degrees of inflammation 2. Exposure of dentine gaps in CEJ, leaving alive the other gingival structures that cover it, within inflammation degrees. 3. Destruction of odontoblasts in external surface of root, leaving other pulpal structures alive, within inflammation degrees. 4. Loss of epithelial remains of malassez along with cement oblasts in external root surface, with necrosis or loss of periodontal ligament (5).

Various etiology that can damage the cervical region of the root surface and may initiate ICR. These include trauma, chronic inflammation of pulp/periodontal tissues or both, induced pressure in periodontal ligament (orthodontic movement), tumours (6). There are several schools of thoughts on the nature of the resorptive process. Some have considered it as inflammatory reaction, whereas few has described it as an aseptic resorptive process, which may sometimes get secondarily invaded by micro-organisms. Microorganisms from either the gingival sulcus, pulp space or frown within the dentinal tubules with necrotic pulps provide the required stimulus to sustain ICR lesions. The ICR may vary clinically from a small defect in the gingival margin to a resorptive defect which is large and may cause pink coronal discoloration of the crown. This pink appearance is because of the underlying granulation tissue showing through the thinned overlying enamel. In case of no pinkish discoloration this lesion might go unnoticed it involves pulp of shows periodontal involvement, because these lesions are usually painless (7). Radiographically, the lesion can vary from well delineated radiolucency's that are quite obvious to poorly defined lesion with irregular borders. However, Given the osseous nature of the advanced lesion, lesions might have a mottled appearance (8). According to Heithersay (9), ICR can be clinically classified into 4 types

• A small penetration of resorptive lesion in the cervical area with little involvement of the dentin.

• A distinct resorptive lesion piercing deeply into the dentin, close to the pulp, but without reaching the root dentin.

• A deep resorptive lesion invading the dentin and affecting both the coronal dentin and the coronal third of the root.

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• An enlarged invasive resorption extending beyond the coronal third of the root.

One of the major drawbacks of conventional radiography is the limited information regarding the true extent and nature of the resorptive lesion (10) therefore, cone beam computed tomography (CBCT), an extraoral threedimensional imaging technique, was used to assess ICR lesions. Prior to each treatment, the position, depth, and ultimately the restorability of the tooth can be objectively assessed using CBCT (5).

Case Report

A 25-year-old, male patient came to the Department of Conservative Dentistry and Endodontics with the chief complaint of bleeding gums, mild pain and small cavitation (Figure 1) in maxillary right front tooth region since few months. The patient noticed a lesion that had increased in size over a period of 3 - 4 years. Patient gave a history of trauma due to fall to maxillary anterior tooth region 5-6 year ago. There was no relevant medical history, and this was the patient's first dental visit. He had good oral hygiene and normal healthy gingiva in all areas of the mouth except on the labial surface of tooth # 13. The marginal gingiva of maxillary right canine was slightly erythematous. On clinical examination, cervical region of maxillary canine revealed a cavitated lesion (Figure 1) that appear to originate sub gingivally, the electric pulp test was negative. Periodontal probing was within the physiological limit at all the sites except for the labial surface at cervical region which was more than 5mm (Figure 2) on probing the cavitated area it gave a fibrous sensation and bleeding was observed. The Intra oral periapical radiograph revealed radiolucency on dista surface of tooth (Figure 3). To understand the specific anatomical knowledge in details, patient was referred for CBCT (CS 9300, Carestream Dental India, Goregaon, Maharashtra, India) analysis. The various sections of CBCT revealed the entry point of granulation tissue to be located in cervical region and showed irregular canal morphology with scattered radiolucency indicative of ICR. (Figure 4). The resorptive lesions which are invasive in nature with dentine penetration and pulpal involvement was evident close to the cervical region, contributing to the establishment of the ICR class III (Heithersay's GS classification) clinical classification. The clinical diagnosis was asymptomatic irreversible pulpitis with class 3 ICR.

Management

Root canal treatment with non-surgical debridement and restoration of the resorptive lacuna was the choice of treatment. After informed consent, root canal treatment was initiated under local anaesthesia -Lignox 2% (Indoco remedies Ltd., Gandhinagar, Gujrat, India) access opening was done; the cavitation site housed with granulation tissue. The resorptive site was debrided by irrigation with alternating solutions of 5.25% NaOCl (Hypo sept, UPS Hygiene's Pvt. Ltd. Mumbai, India) and 17% EDTA solution (Dent Wash, prime Dental, Thane, India). The Granulation tissue was taken out efficiently from the cavitation site. The determination of working length was done using apex locator (E-pex pro, Eighteenth, Changzhou, Jiangsu, China) and confirmed using Intra oral periapical radiograph (Figure 5) the canal was cleaned and shaped using Neo-endo (Orikam, Gurugram, India) rotary files to file size no 30/6% and calcium hydroxide (Avue Cal, Dental Avenue, Param Enterprises, Pune, India) dressing was given for 7 days (Figure6). After 1 week, calcium hydroxide (Avue Cal, Dental Avenue, Param Enterprises, Pune, India) was removed canal was dried with absorbent paper points and a gutta-percha (#30/0.06) (Dentsply Maillefer, Ballaigues) was placed in canal to maintain its patency (Figure:7), during the restoration process. The walls of

cavity were treated with 90% aqueous solution of trichloroacetic acid (TCA) with gentle pressure for 1 minute, the cavity was dried, and the resorptive area was filled with glass-ionomer cement (Figure:8). Thereafter, the endodontic access was also sealed with composite resin -Te-Econom Plus (Ivoclar Viva dent, Mumbai, India). Thereafter, the patient was re-evaluated on a regular basis. The teeth were asymptomatic with no periodontal pockets circumferentially. Long term recall showed satisfactory gingival healing. Eighteen -month follow-up of the cased not reveal any recurrence (Figure:9).

Discussion

The recommended treatment for class III invasive cervical resorptive lesion is often immediate or eventual extraction but some can be treated without surgery with favourable conditions and patient's cooperation. The favourable conditions include the following:

- Resorption should be accessible without excessive removal of cervical and root dentin.
- Sufficient structural integrity of tooth after debridement of resorptive lacuna which gives a reasonable prognosis.
- On computed tomography (CT) images, the outer root surface should be radiographically intact.
- Patients must be "on board" for treatment and conservative prognosis (11).

Surgical access is often impractical when resorption extends apically to the alveolar ridge. If the external approach to resorption requires bone removal, there is often bone removal from adjacent teeth and periodontal defects near tooth with resorption.

For the internal approach, chemical-mechanical debridement was performed by making an endodontic access using a round bur in combination with 90% aqueous TCA, calcium hydroxide (Ca [OH]2), and

sodium hypochlorite. Accurate diagnosis is of utmost importance because the etiology and remedy of internal and external absorption are different (7). Frequently, these lesions can be misdiagnosed and confused with caries or internal resorption, resulting in inappropriate treatment. This case report demonstrates the effect of accurate diagnosis in resorption. It is vital to distinguish between ICR and subgingival caries. Subgingival caries is sticky on probing shows no pink spots.

The foundation of ICR defect will feel hard and makes a scraping sound during inspection. Probing the ICR defect and/or the associated periodontal pocket results in profuse bleeding through the underlying highly vascularresorptive tissue. Removal of granulation tissue from ECR lesion, the cavity wall will fell hard and mineralized upon probing. The edges of the cavity usually appear sharp and narrow. Teeth with ECR respond positively to the sensitivity test because the pulp is only involved in her very advanced cases of ECR (12). The utility of new diagnostic tools, especially CBCT imaging, can significantly contribute to choosing the most appropriate approach (13) Cone beam computed tomography (CBCT) scan by CS 9300 3D, (Carestream Dental India, Goregaon, Maharashtra, India) furnished specific knowledge regarding size, location, and extension of the ICR lesion (13).

Calcium hydroxide is recommended to neutralize the invasive cervical resorption. Researchers have suggested that calcium hydroxide helps to eliminate microbes and inactivate toxic products. Additionally, calcium hydroxide helps stimulate the formation of a hard barrier when the resorptive lesion perforates the periodontal ligament (14).

No material can fulfil the ideal requirements for a cavity, usually within the biological width, where chronic periodontal problems may occur. In terms of

biocompatibility with gingival tissues, utilising products like Bio dentine (Septodont, Saint-Maur-des-fosses, France) or glass ionomer is better than composite resin (15, 16), which may also form a long epithelial attachment (11).

Nanohybrid composite resins might not be compatible for periodontal tissues, but when well-polished, these composite resins reduce plaque formation (compared with Bio dentine or glass ionomer) and might produce a successful clinical outcome (17). Trichloroacetic acid dipped in a cotton pellet is adapted on the resorptive cavity and it promotes coagulative necrosis of the infiltrating tissue by penetrating smaller, less accessible recesses and resorptive channels (9, 16).

Care should be taken when using trichloroacetic acid due to the potential irritation it may inadvertently cause to the surrounding soft tissues (9, 18). Single-tooth isolation or split dam techniques are needed to keep trichloroacetic acid from inadvertent contact with the adjacent tissues. In the case of difficult isolation, 3%– 5% sodium hypochlorite may be used similarly to trichloroacetic acid (9).

Some authors recommend refreshing the bonding surface with a bur, as demineralization of dentin by trichloroacetic acid can affect bonding procedure (11). In Spite of lack of evidence-based research on the topic, this issue shall be taken into consideration.

Conclusion

ICR can be arrested using the "Heithersay approach" (i.e., mechanical debridement, treatment with TCA, and reconstitution). Careful case selection and appropriate execution lead to successful treatment and long-term tooth preservation. Important aspects are lesion location, size, accessibility, and tooth structural integrity. Conebeam CT is a critical tool for the evaluation and treatment of ICR.

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Figure Legends



Figure 1: a cavitated lesion at cervical region of right maxillary canine(arrow).



Figure 2: Probing depth more than 6mm



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Figure 3: IOPA of right maxillary canine.



Figure 4: CBCT sections: invasive cervical resorption.



Figure 5: Working Length



Figure 6: calcium hydroxide placement.



Figure 7: Gutta-Percha was placed in canal to maintain its patency.



Figure 8: Glass-ionomer cement.



Figure 9: Eighteen months follow up.