

SURGICAL MANAGEMENT OF EXTERNAL CERVICAL RESORPTIVE LESION OF MANDIBULAR POSTERIOR TEETH USING BIODENTINE

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ABSTRACT

The external cervical resorption (ECR), a type of root resorption, is generally an uncommon lesion which may involve both anterior as well posterior teeth. The aetiology of it is not very clear and the diagnosis of such lesion poses a challenge to the dentist. If left untreated, such lesions in their extensive form, may lead to the complete loss of tooth. The ECR involving mandibular posteriors may often have some difficulties while managing it through surgical approach. The diagnosis of the lesion, possible aetiology and its surgical management including restoration of defects with a new biosilicate material i.e. Biodentine have been discussed in this case report.

INTRODUCTION

Root resorption can either be physiological or pathological process and is generally the result of activity of tooth resorbing cells, known as dentoclasts that leads the removal of cementum and/or dentine [1]. According to its location in relation to the root surface, the root resorption might be of two types i.e. internal or external resorption. External root resorption (ERR) can be further sub-divided into surface resorption, external inflammatory resorption, external replacement resorption, external cervical resorption (ECR), and transient apical breakdown [2]. One of the least understood type of external resorption is ECR. As explained by Heithersay, "Invasive Cervical Resorption" (ICR) is a suitable term for this type of external resorption because of its invasive and aggressive nature [3-6]. Other synonyms for ECR include odontoclastoma, peripheral cervical resorption, extracanal invasive resorption, supraosseous extracanal invasive

resorption, peripheral inflammatory root resorption, and sub-epithelial ERR [7-12]. In this case report, ECR is the preferred term, as it represents its starting point on the tooth. ECR generally occurs below the epithelial attachment of the tooth at the cervical region and such lesions may have difficulties to diagnose and manage [13].

Considering its etiology, some local factors like impacted teeth, orthodontic treatment, tumors and cysts, luxated or reimplanted teeth, periradicular inflammatory lesions, periodontal disease, and tooth bleaching, are supposed to be involved in causing external resorption. Also, some systematic disorders like hypoparathyroidism, hyperparathyroidism, calcinosis, Turner's syndrome, Gaucher's disease, and Paget's disease have also been considered as the causative factors of external root resorption [14].

Early correct diagnosis and suitable treatment are keys to successful outcome. A pink discoloration of the crown may be indicative of ECR, although some teeth may have absence of any visual signs. The lesion is most often detected on radiographs or during clinical examination, since most cases are asymptomatic [15].

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On intra oral periapical radiographs (IOPA), lesions may vary from well delineated radiolucencies that are quite obvious to poorly defined lesions with irregular borders and sometimes, mimic caries. When ECR is superimposed in the pulp space, pulp space anatomy is generally remains undisturbed [16]. Unless appropriate management is initiated, the resorption continues to extend which may finally lead to irreversible loss of tooth structure [17].

Depending on the extent of lesion, it can be managed either non-surgically or surgically. The granulation tissue is removed either through curettage or with the help of a round bur. During the removal of the bone-like tissue, several time applications of 90% trichloroacetic acid (TCA) is done with a small cotton pellet in order to achieve coagulation necrosis [18].

The granulation tissue is removed until no connection with pulp space is detected and the defect is supported with sound dentine, then the defect is restored with a suitable restorative material. Endodontic treatment is performed when indicated. The treatment should aim towards eliminating all active resorbing tissue and proper sealing of the defect for the long term survival of the tooth [18].

Various materials like glass ionomer, resin-modified glass ionomer (RMGI), light-cured resin composite, amalgam, and mineral trioxide aggregate (MTA) have been recommended to restore the resorption [19]. Among the available material, a new bioactive cement, Biodentine (Septodont, St. Maur-des-Fossés, France), can be a valid option since it acts as a dentin substitute [20, 21]. When Biodentine was used to seal perforations in the furcal area, it induced the repair of the periodontium and new cementum formation over the material [20, 21].

Therefore, the diagnosis of lesion, the possible etiology and its surgical management including restoration of defects with a new biosilicate material i.e. Biodentine have been discussed in this case report.

CASE REPORT

A 24-year-old male patient reported to the Department of Conservative Dentistry & Endodontics with a chief complaint of pain in the lower right back tooth region.

There was no history of external trauma, orthodontic treatment, or bleaching. There was no relevant medical history. On clinical examination, he had good oral hygiene and normal healthy gingiva in all areas of the mouth except on the buccal surface of tooth # 45, 46 (Fig. 1 – Pre-operative intra-oral photograph). The tooth #47 was missing since he got the tooth extracted two years before because of extensive carious involvement. The marginal gingiva of the right posterior quadrant was enlarged in fashion similar to life saver pattern and also it was bulbous. On probing the soft tissue, a fibrous sensation was felt and bleeding was observed. Probing of

the defect with an explorer gave a feel of the hard underlying tissue. The teeth was appeared normal in color and the teeth responded normally to cold vitality test.

Intraoral periapical radiographs (Fig. 2 – Pre-operative IOPA radiograph) showed proximal well-demarcated area of radiolucency at the cemento-enamel junction (CEJ) extending coronally with teeth # 45, 46. There was no interdental bone loss, the lamina-dura was intact, and the periodontal ligament space was normal in the periapical area. A provisional diagnosis of ECR associated with the teeth #45, 46 was made.

MANAGEMENT

For management of defects with respect to #45, 46, surgical procedure was planned. The procedures were explained to the patient. After informed consent was taken, full thickness mucoperiosteal flap (Fig. 3 – Full thickness mucoperiosteal flap reflection) was raised buccally and on the lingual side an envelope flap was raised. The resorptive defects has been shown clinically from the buccal as well as lingual side in the Fig. 4 (ECR defect shown from buccal side) & Fig. 5 (ECR defect shown from lingual side) respectively. Proper debridement and curettage of defects was done with the help of curettes (Fig. 6 – Curettage of the resorptive defect). After adequate isolation of the defects, clinically, no perforation into the pulp was found and the defects were restored with Biodentine (Fig. 7 - Restoration of ECR defects with Biodentine) using proper manipulation protocol followed by contouring.

Also, a bony ridge was seen at the marginal alveolar area and this was recontoured with surgical bur under continuous irrigation after Biodentine final set (Fig. 8 – Marginal recontouring of bone). After complete inspection of the site, the flap was repositioned and sutured with 3-0 black silk suture material. Finally, the postoperative IOPA radiograph was taken (Fig. 9 – Post-operative IOPA radiograph).

Post-surgically, proper instructions were given to the patient along with necessarily prescribed medications. Patient was recalled after seven days for suture removal. On recall visit, clinically, the surgical area was healed adequately without any postoperative symptoms (Fig. 10 – Surgically operated site after suture removal).

Patient was recalled for follow-ups at 1, 3, 6 and 12 months interval. At 6 month follow-up visit, clinically, normal soft tissue morphology was seen (Fig. 12 – Six months follow-up photograph). The patient was completely asymptomatic and no recurrence of the lesion was noted after six months recall.

DISCUSSION

External root resorption (ECR) in multiple permanent teeth is a rare phenomenon. It occurs when the balance between osteoblastic and osteoclastic activities, which maintain the physiological state of the tooth root



and bone, is disturbed, resulting in the removal of the pre-cementum and cementoblasts from the root surface[22]

External resorption associated with inflammation in marginal tissue presents a difficult situation. Because the etiologies and treatment regimens for internal and external resorption are different, accurate diagnosis is of much importance. Many times lesions are misdiagnosed and confused with caries and internal resorption, resulting in inappropriate treatment. It is important that most external cervical resorptive lesions should not be treated as endodontic problems. In many cases, this resorptive condition may be treated without sacrificing the pulpal vitality.

The etiology of ECR is poorly understood, and this has led to the use of multiple terms to describe it. In the present case, the patient did not give any history that could be linked to any predisposing factors, but the presence of posterior cross bite suggested some sort of trauma. The proposed theory of pathogenesis involves predisposing root conditions and perpetuating bacterial factors. It is hypothesized that an initial physical injury to the root surface [23] or the presence of natural cementum defects may predispose to resorption by altered host tissues modified by a bacterially driven stimulus [24].

ECR is associated with inflammation of the periodontal tissues and does not have any pulpal involvement[25]. The pulp remains protected by a thin layer of pre-dentin until late in the process, and it has been postulated that bacteria in the sulcus sustain the inflammatory response in the periodontium [3]. This pulpal protection is because of the fact that pre-dentin possesses a resistance to resorption.

Cavities located on the proximal surface are more easily detected than those located on the buccal or palatal surfaces. Radiographically, the presence of a communication with pulp is difficult to ascertain presurgically. More commonly, pulp exposure occurs because of the accidental mechanical removal of the thin pre-dentin separating the inflamed tissue from the pulp.

A clinical classification has been developed (Heithersay GS 2004) [26] for assessment of cases of ICR as follows:

1. Class 1: denotes a small invasive resorptive lesion near the cervical area with shallow penetration into dentin.
2. Class 2: denotes a well-defined invasive resorptive lesion that has penetrated close to the coronal pulp chamber but shows little or no extension into the radicular dentin.
3. Class 3: denotes a deeper invasion of dentin by resorbing tissue, not only involving the coronal dentin but also extending into the coronal third of the root.
4. Class 4: denotes a large invasive resorptive process that has extended beyond the coronal third of the root.

In the present case, the resorptive defect appeared to arise close to the epithelial attachment but showed little extension into the radicular dentin, thus, it could be assessed as a class 2 lesion according to this classification.

This case report shows the importance of accurate diagnosis as the clinical presentation here was very similar to that of cervical or root caries very close to the pulp which may require root canal therapy. In ECR, on probing the resorption cavity walls with an explorer, a hard, mineralized tissue sensation was felt, accompanied by a sharp, scraping. This feature and the appearance of knife-edge cavity borders are important in the differential sound diagnosis from root caries.

Considering restoration part, Biodentine offers a viable option for complete sealing of resorptive defect and it has the capability to induce the repair of the periodontium and new cementum formation. Also, this material seems to be more advantageous over MTA in various perspectives [20, 21]. The follow-up visits represented completely asymptomatic patient with full recovery of affected gingiva to its normalcy and without any sign of recurrence of this lesion.

Figure 1. Pre-operative Intra-oral Photograph



Figure 2. Pre-operative IOPA Radiograph

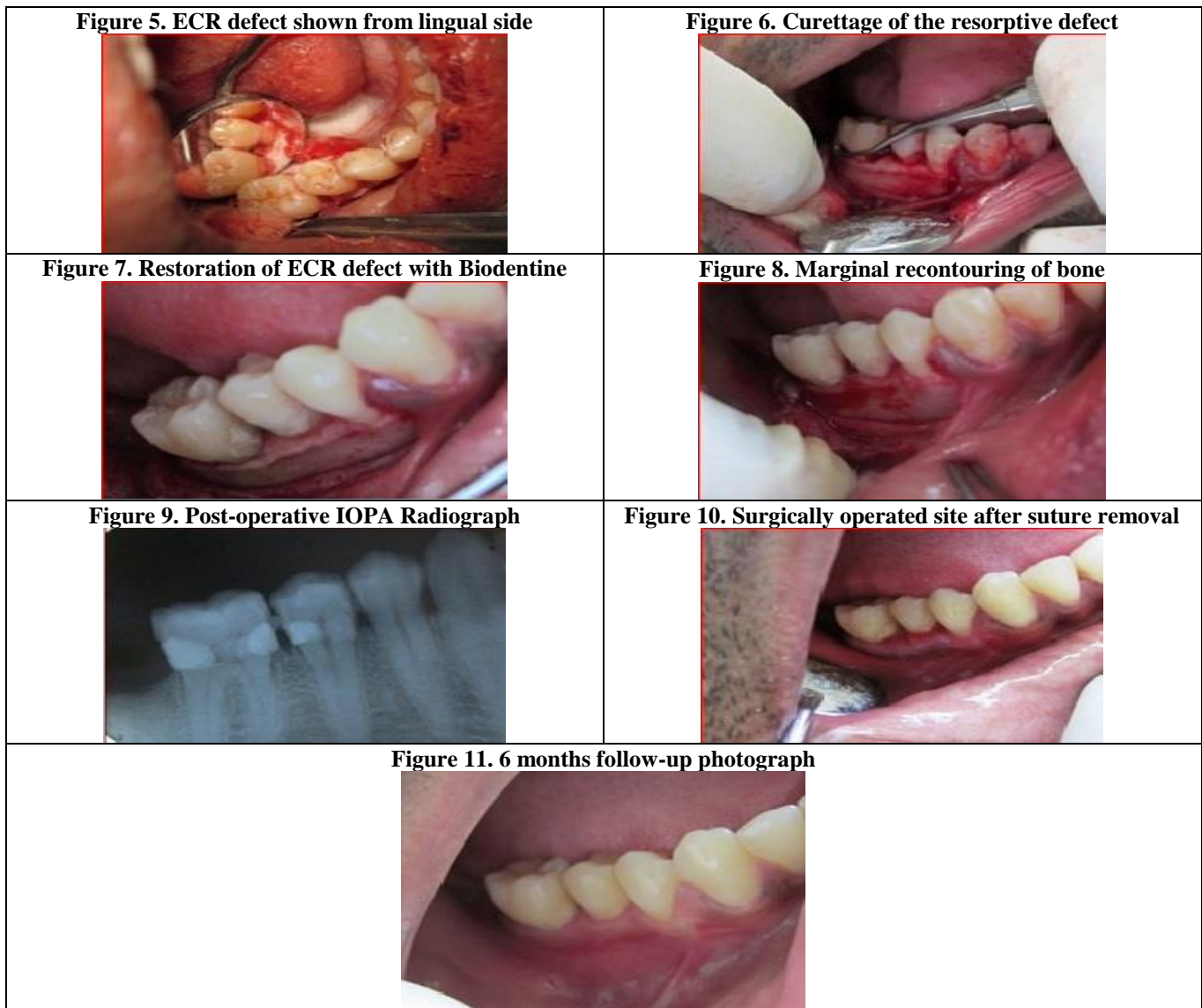


Figure 3. Full thickness Mucoperiosteal Flap reflection



Figure 4. ECR defect shown from buccal side





CONCLUSION

Early detection is essential for successful management and outcome of ECR. Patients with a history of one or more predisposing factors should be monitored closely for initial signs of ECR. Also, among the materials available for restoring such defect, Biodentine can be a viable option because of several advantages including its regenerative potential.

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CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

STATEMENT OF HUMAN AND ANIMAL RIGHTS

All procedures performed in human participants were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This article does not contain any studies with animals performed by any of the authors.

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