**CASE REPORT**

**Use of Biodentine™ in the Treatment of Invasive Cervical Resorption: A Case Report**

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**Abstract:** This paper report a case describing the diagnosis and treatment of an external root resorption in the upper right central incisor with surgical approach following endodontic treatment using the new dental cement Biodentine™ in an attempt to repair the defect. Early diagnosis and appropriate treatment are the keys to a successful outcome. This case report presents a favorable clinical outcome when Biodentine was used for treating external cervical resorption.

**Keywords:** biodentine; dental trauma; external cervical resorption; surgical management.

**INTRODUCTION**

External root resorption is a progressive and destructive loss of tooth structure, initiated by a mineralized or denuded area of the root surface. Invasive cervical resorption is a clinical term used to describe a relatively uncommon, insidious, and often aggressive form of external root resorption. (1) It is seen in most cases as a late complication of traumatic injuries of the teeth, but it may also occur after internal bleaching, orthodontic tooth movement, orthognathic and other dento-alveolar surgery, periodontal treatment and a wide variety of traumatic conditions (2,3)

Frequently, cervical resorption are confused and misdiagnosed as caries and internal resorption, leading to improper treatment or unnecessary loss of the tooth (4) Materials such as amalgam, composite resin, glass ionomer, and mineral trioxide aggregate (MTA) have been used in past for restoring the resorptive defect (Isidoret et al., 2006). The present case involved the use of new calcium silicate-based cement called Biodentine (Septodont, Saint-Maur-des-Fosses, France) for the treatment of an invasive cervical resorption in the maxillary right central incisor.
A 35 year-old healthy male patient presented to the Department of Department of Conservative Dentistry and Endodontic EPS FarhatHached (Sousse -Tunisia) with no symptoms but with labial gingival inflammation in the maxillary right incisor region. The patient reported a history of trauma. Endodontic testing found that the tooth was non tender to pressure and percussion and responded negatively to cold compared with the adjacent teeth. The labial gingival tissue was inflammatory and slightly tender to palpation with the presence of periodontal pocket (Figure 1). Periapical radiographs showed an apparent radiolucency in the cervical third of the root canal, involving the root canal associated to a peri-apical radiolucency (Figure 2). On the basis of history, clinical examination and radiographic findings a diagnosis of chronic peri-apical periodontitis and external cervical resorption (class 3 invasive cervical resorption as described by Heithersay). The patient was given a detailed explanation concerning the planned treatment procedure and prognosis. This included surgical exposure, debridement, and restoration proceeded by endodontic treatment. Consent was received from the patient.

Fig 1: Pre-operative extraoral view: gingival inflammation.

The tooth was isolated with a rubber dam after the application of local anesthesia. A conventional access cavity was prepared. The root canal was cleaned and shaped using rotary nickel-titanium Revo-S ® instruments (Micro-Mega, Besançon, France) in a crown down approach. The working lengths were determined using electronic apex locator (Rootor, META BIOMED, Korea) and established working lengths were controlled radiographically (Figure 3). During preparation, the canals were copiously irrigated with 2.5% sodium hypochlorite and 17% EDTA. Calcium hydroxide paste (MM-Paste™, Micro-Mega, Besançon, France) was placed as an intracanal medication and the access cavity was sealed with a temporary filling (MD-Temp™, META Biomed co, Korea). On the subsequent visit (2 weeks later), as the patient was completely asymptomatic, the root canal was rinsed thoroughly, dried with the help of paper points and obturated using lateral cold condensation technique.

Fig 2: Periapical radiograph of tooth 11 showing a radiolucent area at the distal aspect of the tooth and periradicular radiolucency. Fig.3: Working length determination.

An immediate post-operative radiograph was performed to control the quality of three root canal obturation. An excess of gutta-percha observed in the resorptive cavity will be removed later (Figure 4). As the lesion was clinically not accessible, a
surgical approach opted to repair the resorptive
defect; after administering anesthesia (Figure 5a),
intrasulcular incisions were made on the labial aspect
of maxillary right central incisor (Figure 5b) and 2
vertical incisions to complete the full-thickness flap
(Figure 5c). The resorption cavity was curetted
to remove the devitalized tissue and the excess of
gutta-percha (Figure 6a). The irregular borders of
the defect were smoothed with a bur and the cavity
was thoroughly irrigated with sterile saline
solution (Figure 6b).

Biodentine™ was mixed according to the
manufacturer’s instructions (Figure 7a-b) and was
firmly condensed in the cavity (Figure 8). The flap
was sutured in place and postsurgical instructions
were given to the patient (Figure 9a). An immediate
post-operative radiograph was performed to control
the sealing of the resorptive cavity (Figure 9b). A
week later, the sutures were removed. No
postoperative complaints were noted and the patient
was completely free of pain.

Clinical and radiographic follow up for 12 months
showed satisfactory results with arrest of root
resorption and progressive healing of the defect and
the periapical lesion (Figure 10). Subsequent recalls
were planned at 6-month intervals. However, the
patient moved to another city and could not be
controlled for further recall visits because of this
relocation.
DISCUSSION

External cervical resorption (ECR) is the loss of dental hard tissue as a result of odontoclastic action. This inflammatory tissue loss occurs immediately below the epithelial attachment of the tooth (5). The exact cause of External cervical resorption is poorly understood, several etiologic factors have been suggested that might damage the cervical region of the root surface and therefore initiate external cervical resorption: these include dental trauma, orthodontic treatment, intracoronal bleaching, periodontal therapy, and idiopathic etiology (6, 7). Heithersay (1999) classified ECR according to the extent of the lesion within the tooth: class 1; a small invasive resorptive lesion near the cervical area with shallow penetration into dentin; class 2; a well-defined invasive resorptive lesion that has penetrated close to the coronal pulp chamber but shows little or no extension into radicular dentin, class 3; a deeper invasion of dentin by resorbing tissue, not only involving the coronal dentin but also extending at least to the coronal third of the root and class 4; a large invasive resorptive process that has extended beyond the coronal third of the root canal (8). A pink spot in the cervical region of the tooth is usually the clinical sign noticed by the patient and/or dentist that brings the problem to light. If there is no pink spot indicating ECR, then the condition might go unnoticed until there is pulpal and/or periodontal involvement, because these lesions are usually painless. External cervical resorption defects are commonly detected as chance findings on radiographs. The lesions vary from well-delineated radiolucencies that are quite obvious to poorly defined lesions with irregular borders and sometimes resemble caries. ECR can be found in one or multiple teeth. When it is diagnosed in one tooth, it is important to carefully examine the rest of the teeth clinically and radiographically for additional occurrences of ECR. The larger lesions can also be misdiagnosed as caries or internal resorption (9). The usual indication that the lesion is not carious is the irregularity of the radiolucency and/or the radiopaque outline of the protective predentine layer of the pulp. By utilizing varying angulation of the radiographs, internal resorption can be ruled out. If the lesion is due to internal resorption, it will remain centered what the direction, or “off-angle” the radiograph is taken. However, if the lesion is one of ICR, Clark’s Rule, or SLOB Rule, can be used to determine the location of the lesion (the most lingual object moves with the direction of the X-ray head) (9). With the advent of CBCT, the clinician is given the opportunity to view teeth and anatomical entities in three dimensions (10). It allows the clinician to make a more definitive diagnosis and establish a confident and realistic plan for treatment, with a higher predictability of success (11, 12). Treatment options were discussed with the patient. It depends on the severity, location, whether the defect has perforated the root canal system, and the restorability of the tooth. Generally, there are three choices for treatment: [1] no treatment with eventual extraction when the tooth becomes symptomatic; [2] immediate extraction; or [3] surgical access, debridement, and restoration of the resorptive lesion (without with endodontic treatment) (10). Appropriate treatment should aim at the inactivation of all resorbing tissue and the reconstitution of the resorptive defect by the
placement of a suitable filling material. Treating invasive cervical resorption lesions with a chemical agent, 90% trichloroacetic acid (TCA) after protective application of glycerol to adjacent soft tissues, before the curettage of the lesion is advocated by Heithersay (7). The TCA was not used in this case, because the isolation of the surrounding tissues in the surgical area could not be maintained as a result of the localization of the defect. After chemomechanical debridement of the defect, many materials have been used to seal the resorptive cavity such as amalgam, composites and glass ionomer and Mineral trioxide aggregate (MTA) (13).

Surgical treatment of varying degrees of invasive cervical resorption has generally involved periodontal flap reflection, curettage, restoration of the defect with amalgam, composite resin, or glass ionomer cement, and repositioning the flap to its original position. Periodontal reattachment cannot be expected with amalgam or composite resin and is unlikely with glass ionomer cement but there is experimental evidence to suggest that this might be possible if MTA is used in this situation (14). Therefore, MTA® was extensively used and considered for many practitioners the material of choice to seal the resorption (3). Biodentine™ is a new calcium silicate–based material which became commercially available in 2009 and that was specifically designed as a “dentine replacement” material. The material is actually formulated using the MTA-based cement technology and the improvement of some properties of these types of cements, such as physical qualities and handling (15). Biodentine™ has a wide range of applications including endodontic repair (root perforations, apexification, resorptive lesions, and retrograde filling material in endodontic surgery) and pulp capping and can be used as a dentine replacement material in restorative dentistry. It has been proposed as a favorable repair material as it can be placed in permanent and close contact with periodontal tissue due to its bioactivity and biocompatibility (15). Compared to MTA, Biodentine has better consistency after mixing which allows ease of placement in areas of resorptive defect and needs much less time for setting (6).

Although case reports are definitely important resources of confirming a material’s suitability for clinical usage, it is undeniable that more reliable results can be achieved through randomized long-term clinical trials. Accumulation of data of long-term clinical trials after a prolonged period might lead to gathering of evidence based data; such has been for mineral trioxide aggregate. Though the chemical characteristics and general features of Biodentine are similar, it is clear that a specific number of clinical trials should be conducted before definite conclusions can be drawn (15).

CONCLUSION

It is important for endodontist to understand the periodontal and restorative aspects of treating ECR. Teeth with ECR are often structurally compromised and may eventually fail even though the endodontic treatment is successful. The endodontic treatment is irrelevant if the resorption is not eliminated, and the restorative aspects are not managed properly. Proper management requires knowledge and skills in endodontics, surgery, and restorative dentistry, and elimination of the resorption is performed most effectively under a microscope. Invasive cervical resorption in advanced stages may present great
challenges for clinicians. Therefore, prevention and early detection must be stressed when dealing with patients presenting history of potential predisposing factors.

Biodentine, a popular and contemporary tricalcium silicate based dentine replacement and repair material, has been evaluated in quite a number of aspects ever since its launching in 2009. The studies are generally in favor of this product in terms of physical and clinical aspects despite a few contradictory reports. However, further studies are necessary to provide more information about the use of Biodentine for the treatment of resorptive defects and obturation of pulp space.

CONFLICT OF INTEREST:
There is no conflict of interests to declare.

REFERENCES:


Abdelmoumen E et al

Inflammatory Root Resorption: A Case Report. JOE 32(8), 798-801.


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