

# Management of External Cervical Root Resorption –A Case Report

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## ABSTRACT

External cervical resorption is typically identified as an incidental finding and can be easily misdiagnosed as a carious cavity. A 38 year male patient reported to the Department with a chief complaint of discolored teeth i.r.t upper right front tooth region since 1 year. On clinical examination a pinkish hue was noted i.r.t 12. Tooth 12,11,22 showed no response to electric pulp test and cold test. Endodontic treatment was performed for tooth 12,11,22. CBCT scan revealed a resorptive lesion i.r.t 12 region. Following periodontal surgery resorptive defect was restored and bony defect was filled with sticky bone. Patient reported asymptomatic after 6 months and showed bony healing.

**Keywords:** External Cervical Root Resorption, Sticky bone, MTA, PRF, Root Canal Treatment, Periodontal surgery

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## INTRODUCTION

Root resorption is induced by a pathologic or a physiologic process that leads to loss of dentine, cementum, and/or bone. due to odontoclastic action . Depending on its location relative to the root surface, it can be classified as internal or external resorption. An uncommon form of rapid external root resorption is referred to as progressive external root resorption. ECR has been described previously in the literature as invasive cervical, asymmetric internal, progressive intradental, peripheral cervical, and cervical external resorption<sup>[1]</sup>.

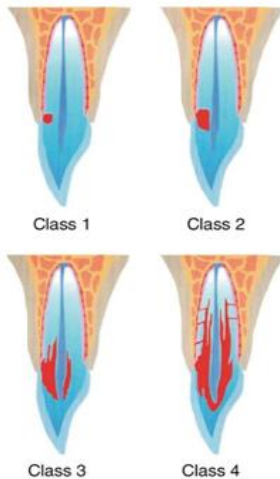
A recently published position statement by the European Society of Endodontics (ESE) has gone some way to provide clarity and establish a baseline for further research into this condition. The ESE position statement highlights the uncertainty regarding the exact cause of ECR. Building on recent literature reviews, orthodontics, trauma, bleaching, and iatrogenic damage are described as prominent predisposing factors. In the past few years, greater focus has been placed on histopathologic analysis with hope that this might shed light on a distinct cause and to offer innovative methods for its management

ECR is typically identified as an incidental finding and can be easily misdiagnosed as a carious cavity. Plain film radiographs are also inadequate diagnostic tools for ECR because of the masking effect caused by the relative radiodensity of the remaining tooth structure and overlying alveolar bone. The often unpredictable shape of the resorptive pattern can also contribute to a delay in identifying the lesion until significant resorption has already occurred. Recently, cone-beam computed tomographic (CBCT) imaging has been used extensively to provide a more accurate representation of these lesions<sup>[2]</sup>.

The conventional method for the classification of ECR is the Heithersay classification. Heithersay's proposed classification uses plain film radiographs in categorizing the 2-dimensional infiltration of resorption along the root (class I–class IV)

Class I	A small invasive resorptive lesion near the cervical area with shallow penetration into dentin
Class II	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
Class III	A deeper invasion of dentin by resorbing tissue, not only involving the coronal dentin but also extending into the coronal third of the root
Class IV	A large, invasive resorptive process that has extended beyond the coronal third of the root

Heithersay classification for prognosis of invasive cervical resorption (ICR) lesions



Height	Circumferential spread	Proximity to the root canal
1: At the cemento-enamel junction level or coronal to the bone crest (supracrestal)	A: $\leq 90^\circ$	d: lesion confined to the dentin
2: Extends into the coronal third of the root and apical to the bone crest (subcrestal)	B: $> 90^\circ$ to $\leq 180^\circ$	p: probable pulpal involvement
3: Extends into the midthird of the root	C: $> 180^\circ$ to $\leq 270^\circ$	
4: Extends into the apical third of the root	D: $> 270^\circ$	

However, because of the increased use of CBCT imaging in dentistry, Heithersay's 2-dimensional classification system is being challenged by a new 3-dimensional classification system proposed by Patel et al.

### CASE REPORT

A 38 year male patient reported to the Department of Conservative dentistry & Endodontics with a chief complaint of discolored teeth i.r.t upper right front tooth region since 1 year. Patient gave a history of trauma 4 years back, and loss of tooth i.r.t 21. On eliciting history, the patient presented with a discolored upper lateral incisor with no associated symptoms [Figure 1a,1b].



Fig 1a



Fig 1b

There was no relevant medical or dental history. On clinical examination a pinkish hue was noted i.r.t 12, Tender on percussion . Tooth 12 ,11, 22 showed no response to electric pulp test and cold test. On radiographic examination tooth 12 showed a well defined proximal radiolucency at the mesial cervical region which is extending below the inter dental bone with periapical radiolucency ( fig 1c). Radiolucency along the middle third of mesial side of the root with coronal radiopacity suggestive of intact cervical interdental bone (fig 1d) .



Fig 1c

Fig 1d

A definite diagnosis of pulpal necrosis with symptomatic apical periodontitis was made in relation to tooth 12,11,22 with external root resorption irt 12. Followed by which patient was referred to department of Periodontics for the periodontal evaluation and opinion .On Intra Oral examination generalized local factors were present . Gingiva showed acute inflammatory signs with clinically evident bleeding on probing irt 12. Periodontal findings like pocket depth and mobility as not evident.



The treatment plan was advised for orthograde root canal treatment followed by curettage and surgical repair of the external resorptive defect in relation to tooth 12. Treatment plan was explained to the patient and informed consent was obtained from the patient, before the intervention. In the first visit, the access cavity was prepared for tooth 12,11 and 22 ( Fig 2A ) , and initial negotiation was done with No. 15 stainless steel hand K-file( MANI MEDICAL INDIA PVT LTD). Working length was determined to be 21mm for tooth 12, 23mm for 11 and 18.5 mm for tooth 22 . Cleaning and shaping was done using the step-back technique .



Figure 2a

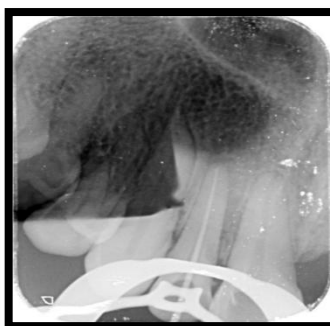
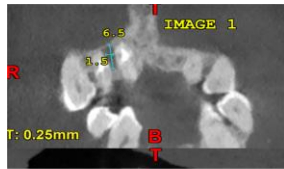
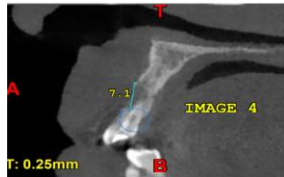


Figure 3

During instrumentation canals were irrigated with 2.5% sodium hypochlorite(MEDILISE) and saline( FRESENIUS KABI INDIA PVT LTD) . After biomechanical preparation two rounds of calcium hydroxide dressing was given( 1 week interval) .After two weeks as the patient was asymptomatic obturation was done irt 12,11,22 (figure 3) .A CBCT was advised i.r.t 12 region to determine the extent of resorptive defect before periodontal therapy.



**CORONAL SECTION**  
Reveals the interdental bone defect



**SAGITTAL SECTION**



**SAGITTAL CROSS SECTIONAL VIEW OF 12**

After endodontic therapy patient was kept under observation for 3 months. At 3 month recall patient was asymptomatic and radiographic examination reveals no further progression of the resorptive lesion. Periodontal therapy was planned for the intraosseous defects and for the repair of external root resorption.

### 3 MONTHS FOLLOW UP RADIOGRAPH AFTER OBTURATION OF TOOTH 12,11



### PERIODONTAL SURGICAL PART

On the day of periodontal surgery, after giving adequate amount of LA (LIGNOCAINE 2%). A full thickness mucoperiosteal flap was reflected from 12 to 13 till the visibility of the defect. Through degranulation was carried out with the help of gracey curette. After degranulation resorptive lesion was sealed with the help of MTA.

For the bony defect, sticky bone was prepared ( i-PRF injectable platelet rich fibrin along with one graft) . The bone graft used for polymerization was ossi-graft. After 20 minutes of polymerization obtained sticky bone was placed over the bone defect and condensed within the defect. Flap was approximated with the help of composite button suture with 4-0 vicryl. Post operative instructions were given and analgesics and antibiotics were prescribed. Patient was recalled after one week for reevaluation. After one week of re evaluation , healing was satisfactory. Oral hygiene instructions were given.



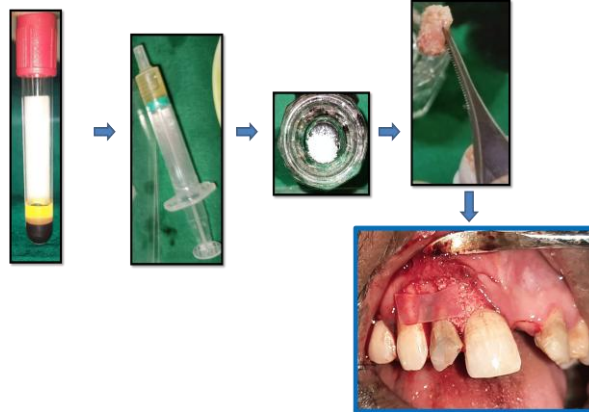
**Full thickness mucoperiosteal flap elevated**



**Degranulation**



**Accessing the bone defect and external root resorption**



MTA was mixed according to the manufacturers instruction and delivered to the resorption site

A 10 ml sample of venous blood was drawn intravenously and iPRF was obtained. Sticky bone was placed and collagen membrane was adapted



Suture placed



1 week re- evaluation



6 months re-evaluation



Pre operative radiograph



1 week recall



6 months postoperative

**DISCUSSION**

Successful treatment of subgingival external root resorption lesion often depends on combined restorative periodontal procedure. The treatment of root resorption is not always possible ;the size,location,and restorability of the tooth are difficult obstacles to overcome. To achieve predictable lasting success, careful case selection in the management of ECR is of paramount importance. ECR usually starts in the cervical region of the affected tooth and initially involves

only the periodontal ligament, cementum and dentine. However, in more advanced stages the pulpal tissues may also become involved (Luso & Luder 2012, Mavridou et al. 2016, Navid & Saberi 2018)<sup>[1]</sup>.

Classification systems are used extensively in dentistry. Their use is predominantly research focused because they allow uniformity of descriptors and play a significant role in providing data on treatment outcomes. The most prominent example of this in ECR is the Heithersay classification. This classification was initially developed for research purposes but went on to provide prognostic data showing that treatment of Heithersay class I, II, and III lesions carries a considerable chance of a favorable outcome, whereas class IV lesions are best monitored or extracted<sup>[1]</sup>.

In the present case, the traumatic injury was the major contributing factor for the resorption. Since the affected tooth remained untreated for a long duration, the ultimate result of the chronic low-grade infection has led to the resorptive defects. The lesions were initiated by the damage that was caused from the trauma and inflammation of the dental pulp and periodontium. Once the infection is established in the root canal space, the by-products from the bacteria and tissue breakdown can stimulate inflammation in the adjacent periodontal tissue, leading to progressive, inflammatory resorption of the root<sup>[2]</sup>.

Two major factors are involved in the initiation of root resorption, which includes the loss or alteration of the protective layer over the root surface (precementum or predentin) and then the inflammation that occurs around the root surface. Damage to the protective layer may occur either directly due to trauma of dental injury or indirectly when the inflammatory response occurs as a result of dental injury. Physical damage to the cemental layer will only occur at the specific points where the force of the trauma pushed the tooth into the socket<sup>[1]</sup>.

In 1998, Trope described two groups of IRR and ERR based on the aetiology and trauma origin and exclusively dental trauma based in 2002 . Trope made a substantial effort to define the precise IRR and ERR aetiology. In 1998, the assessment was related to the presence of the periodontal lesion, infection, or combination of both. In 2002, the aetiology appraisal of ERR was broadened to include stimulus duration (short or extended) and infection in an attempt to determine how root-protective layers have been affected and the source of the inflammatory response. Kanas and Kanas considered a Mummery pink tooth a radial pulp enlargement resorption (internal subtype), and if the resorption becomes larger (progressive), it will eventually perforate the lateral root wall and may appear similar to CRR<sup>[3]</sup>.

The ultimate goal of treating such teeth is to primarily arrest the active resorption process, with restoring defect and maintaining the functionality. Studies have shown the accuracy of CBCT in assessing the external and internal resorption .The use of CBCT, in the present case, was to evaluate the three-dimensional location, size, and accessibility of the resorptive defect. Complete debridement of the resorptive tissue is an essential part of treating external root resorption. In this case sticky bone was placed for the bone defect, which is moldable so well adapted over the bony defect. This fibrin network entrap the platelets and leukocytes to release growth factors, so bone regeneration and soft tissue regeneration is accelerated.

Various materials have been proposed to seal the invasive cervical resorptive defect, such as GIC,MTA,BIODENTIN, BIOAGGREGATE etc .Considering the availability MTA was used in this case.Sumer et al. (2006) stated that MTA shows excellent biocompatibility. Arens and Torobinejad (1996) treated apical perforations and osseous repair with MTA. Koh et al. proved that MTA can produce interleukins and hence provides an active substrate for the regeneration of bone cells.

## CONCLUSION

In order to retain a tooth with external cervical root resorption for a long time, early diagnosis, appropriate restorative and regenerative material along with a suitable treatment plan are critical for the long term and good prognosis of the tooth.

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