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Case Report

Surgical Management of External Cervical Resorption Associated With a Large Periapical Lesion and Extruded Endodontic Sealer in a Young Patient: A Case Report

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ABSTRACT

Background: External cervical resorption (ECR) is a pathological loss of dental hard tissue initiated on the external root surface, usually in the cervical region. Its diagnosis and management are challenging because lesions may extend circumferentially and apicocoronally while remaining difficult to characterise on conventional radiographs. Cone-beam computed tomography (CBCT) has substantially improved three-dimensional assessment and treatment planning.[1–3]

Case presentation: A 19-year-old female reported to the Department of Conservative Dentistry and Endodontics with severe pain associated with a previously root-filled anterior tooth. Preoperative periapical radiography and CBCT demonstrated a large periapical lesion, extrusion of endodontic sealer beyond the root apex and an external cervical resorptive defect. Following assessment of the lesion and its surgical accessibility, a tooth-preserving surgical approach was planned. Surgical intervention permitted direct visualisation and debridement of the cervical resorptive defect, removal of extruded endodontic material and management of the associated periapical pathology. The resorptive defect was subsequently repaired using Mineral Triodixe Aggregate (MTA).

Conclusion: This case illustrates the importance of three-dimensional assessment and individualised treatment planning when ECR coexists with substantial periapical pathology and extruded endodontic material. Direct surgical access may permit simultaneous management of otherwise difficult-to-address pathological and iatrogenic findings in appropriately selected teeth. Long-term clinical and radiographic follow-up remains essential.

Keywords: external cervical resorption; endodontic microsurgery; CBCT; periapical lesion; root resorption; extruded endodontic material.

INTRODUCTION

External cervical resorption is an uncommon but potentially destructive form of pathological root resorption characterised by progressive loss of mineralised dental tissues initiated on the external cervical root surface. The process is mediated by clastic cells and may involve periodontal, dentinal and, in advanced lesions, pulpal tissues.[1,2] The precise aetiology remains uncertain. Several potential predisposing factors have been reported, including orthodontic treatment, trauma, intracoronal bleaching and previous surgical procedures; however, associations should not automatically be interpreted as causal relationships.[4]

The clinical presentation of ECR is variable. Lesions may be detected incidentally on routine radiographs, whereas more advanced lesions can present with a cervical defect, gingival changes, pain or periodontal manifestations. Conventional periapical radiography has important limitations because it provides a two-dimensional representation of

a three-dimensional lesion. CBCT can provide information concerning lesion height, circumferential spread, depth and relationship to the root canal and supporting periodontal structures, thereby improving diagnostic confidence and treatment planning.[2,3,5]

Patel et al. proposed a three-dimensional classification based on lesion height, circumferential spread and proximity to the root canal.[3] This system was developed to improve communication of lesion characteristics and provide a more meaningful description than two-dimensional classifications alone. Nevertheless, classification systems should complement rather than replace clinical assessment, particularly because treatment outcomes depend on accessibility, restorability, periodontal involvement and the ability to achieve adequate debridement and repair.[6,7]

Management ranges from observation in selected cases to external surgical repair, internal treatment, combined approaches, intentional replantation or extraction.[8] A recent systematic review found that external surgical access and mechanical removal of resorptive tissue were frequently reported, with bioactive endodontic cements commonly used for repair; however, the available evidence remains dominated by case reports and case series, and no treatment modality can currently be regarded as universally superior.[9]

The present case is clinically relevant because ECR occurred in a previously treated young patient in association with a large periapical lesion and extruded endodontic sealer. Surgical management was selected to permit direct treatment of the cervical resorptive defect and simultaneous removal of extruded material and periapical pathological tissue.

CASE REPORT

Patient information and clinical presentation

A 19-year-old female reported to the Department of Conservative Dentistry and Endodontics with a chief complaint of severe pain associated with a previously treated anterior tooth. The tooth had undergone root canal treatment by another dental practitioner before presentation.

The available clinical records supplied for this report do not provide complete information regarding the patient's medical history, duration of symptoms, periodontal probing measurements, percussion or palpation findings, mobility, vitality testing or previous treatment protocol. These parameters should therefore be added from the original clinical records before submission.

The preoperative clinical photographs demonstrated the anterior mandibular region and the subsequent surgical field. The previously treated tooth was considered amenable to surgical intervention based on the clinical and radiographic assessment.

Radiographic and CBCT assessment

Preoperative periapical radiography demonstrated a previously root-filled tooth associated with a large periapical radiolucent lesion. Endodontic filling material/sealer was visible beyond the apical region. A cervical root irregularity compatible with external cervical resorption was also identified.

CBCT examination provided three-dimensional information concerning the cervical root defect and the periapical lesion. The resorptive defect was located on the external cervical aspect of the root, while the previously treated canal remained identifiable. The imaging also demonstrated extruded endodontic material in the periapical region. The three-dimensional assessment was particularly relevant because the accessibility and spatial extent of an ECR lesion influence the feasibility of external surgical management.[3,5]

The ECR lesion should be formally classified according to the Patel three-dimensional system only after measurements of its height, circumferential spread and relationship with the root canal have been obtained from the original CBCT dataset.[3] Accordingly, a definitive Patel classification is not assigned in this report from the supplied composite image alone.

Diagnosis and treatment planning

The clinical and radiographic findings were interpreted as:

1. External cervical root resorption involving the previously treated tooth;
2. Large periapical lesion associated with the root-filled tooth; and
3. Extrusion of endodontic sealer beyond the root apex following previous endodontic treatment.

The large size of the periapical radiolucency was not interpreted as evidence of a radicular cyst because radiographic appearance alone cannot reliably establish the histopathological nature of a periapical lesion.[10]

Treatment options included extraction, orthograde retreatment, observation where appropriate, and surgical management. The combination of an established cervical resorptive defect, substantial periapical pathology and

extruded material favoured a surgical approach because direct access could permit visualisation and debridement of the resorptive defect, removal of extruded material and management of the periapical tissues. Contemporary ECR management emphasises individualised treatment based on lesion accessibility, extent, periodontal involvement and restorability rather than classification alone.[8,9]

Surgical management
After administration of local anaesthesia, a surgical flap was reflected to expose the affected root surface and periapical region. The intraoperative photographs demonstrate direct exposure of the cervical root surface and identification of the resorptive defect.

The resorptive tissue was surgically debrided under direct visualisation. Pathological tissue associated with the periapical lesion was curetted, and the extruded endodontic material was surgically removed. Direct surgical access was particularly advantageous because the extruded material could be physically identified rather than manipulated blindly through the root canal system.

Following debridement, the resorptive defect was prepared for repair. The defect was restored using MTA. Haemostasis was achieved and the flap was repositioned and sutured. The postoperative clinical photograph demonstrates primary closure of the surgical site.

The exact details of the flap design, magnification, ultrasonic instrumentation, irrigation protocol, root-end resection, root-end preparation, repair material, suturing technique and postoperative medication should be inserted from the original operative record rather than reconstructed from photographs.

Follow-up
The patient was followed up for 1 year and healing was observed radiographically. Also, the patient was completely free of symptoms.

DISCUSSION

External cervical resorption represents a biologically complex process in which resorptive activity occurs on the external root surface. Histopathological investigations have demonstrated a dynamic process involving resorption and repair occurring simultaneously in different areas of the lesion.[1,2] This biological complexity explains why ECR may have an irregular three-dimensional architecture and why conventional radiography may underestimate its true extent.
The diagnosis in the present case was particularly challenging because the tooth demonstrated three clinically relevant findings: ECR, a large periapical lesion and extruded endodontic sealer. These findings should not be interpreted as necessarily representing a single pathological process. In particular, the presence of extruded sealer should not be considered evidence that the sealer caused the ECR. The aetiology of ECR remains incompletely understood, and established risk factors relate principally to factors capable of disrupting the protective root-surface tissues.[4]

CBCT was important for treatment planning because it provided information beyond that available from the periapical radiograph. Conventional radiographs may be unable to accurately establish the location, depth and circumferential extent of ECR, whereas CBCT can facilitate three-dimensional assessment of these characteristics.[2,3,5] The AAE/AAOMR position statement recommends that CBCT use in endodontics should be justified according to the individual diagnostic problem rather than performed routinely.[11] In the present case, the complex resorptive and periapical findings provided a clear clinical rationale for three-dimensional imaging.

The Patel classification describes ECR according to three parameters: lesion height, circumferential spread and proximity to the root canal.[3] Such information is clinically useful because lesions close to the bone crest or with limited circumferential involvement may be more amenable to external access than extensive lesions involving deeper root structures. However, outcome studies demonstrate that ECR classification does not completely predict treatment outcome. Jebril et al. reported survival of all 14 surgically managed teeth at a mean follow-up of 20 months, although clinical success was achieved in 11 cases, highlighting the distinction between tooth survival and complete clinical success.[6]

Longer-term data further emphasise the importance of careful case selection and follow-up. Irinakis et al., in a retrospective cohort of 98 teeth, reported that treatment outcomes were influenced by local and treatment-related factors and that higher Heithersay classes were associated with greater failure rates.[7] These observations reinforce that successful management cannot be inferred solely from lesion classification or from short-term radiographic appearance.
The decision to use external surgery in the present case was based principally on accessibility and the need to address several problems simultaneously. Contemporary management recommendations support external surgical repair when the lesion is accessible and can be adequately debrided.[8] The recent systematic review by Bardini et al. found external surgical intervention to be the most frequently reported method of accessing ECR lesions and mechanical removal to be the most frequently described method of eliminating resorptive tissue. However, the authors emphasised that the

available evidence is predominantly derived from case reports and case series, with no randomised clinical trials establishing an optimal treatment protocol.[9]

An important feature of this case was the presence of extruded endodontic sealer. Extrusion of endodontic materials beyond the root can occasionally be associated with persistent local inflammation or foreign-body reactions. Histopathological evidence has demonstrated foreign-body giant-cell reactions to root-filling materials in persistent periapical lesions.[12] Conversely, clinical and radiographic studies indicate that sealer extrusion does not invariably prevent periapical healing. Sari and Duruturk, for example, reported that extrusion of AH Plus did not ultimately prevent healing, although healing was delayed at an early follow-up point in their population.[13] Therefore, the presence of extruded material should be interpreted in the context of symptoms, location, quantity, tissue response and the overall clinical situation rather than regarded as an automatic indication for surgical removal.

In symptomatic cases where extruded material is associated with persistent tissue irritation or where surgical access is already required for another indication, removal may be clinically justified. Ektefaie et al. described resolution of chronic symptoms following surgical removal of extruded endodontic filling material and surrounding inflammatory tissue.[14] Similarly, surgical removal of extruded endodontic material has been reported in cases involving neurological complications when conservative management was unsuccessful.[15] In the present case, removal of the extruded material formed part of the broader surgical management rather than being interpreted as the aetiological factor responsible for ECR.

Repair of the ECR defect represents another critical component of treatment. Bioactive calcium-silicate materials have become widely used because of their favourable biological characteristics and ability to set in moist environments. Individual case reports have documented repair of ECR using materials including Biodentine and bioceramic materials.[16-18] However, these reports provide relatively low-level evidence and cannot establish superiority of one repair material over another.

The primary objective of repair is to eliminate the resorptive tissue and seal the resultant defect while maintaining periodontal health and structural integrity. Surgical treatment may therefore require careful consideration of the relationship between the repair material and the alveolar bone crest. Periodontal reattachment and soft-tissue management may be particularly important where the defect extends into the periodontal attachment apparatus.

The large periapical lesion represented a further consideration. Large radiolucencies may occur in association with persistent apical infection, extraradicular pathology, foreign material or other inflammatory lesions. Lesion size alone cannot establish histopathological diagnosis.[10] Endodontic microsurgery can provide direct access to periapical tissues and permit removal of foreign material and pathological tissue when appropriately indicated.

The principal strength of this case is the opportunity to manage ECR and significant periapical pathology during a single surgical intervention in a young patient. The use of CBCT allowed three-dimensional assessment before treatment, while direct surgical access permitted visualisation of the cervical defect and extruded material. Nevertheless, the case has important limitations. It is a single clinical observation, and the absence of complete clinical measurements, histopathological information and documented long-term follow-up in the supplied records limits the conclusions that can be drawn. In particular, the case cannot establish a causal relationship between the extruded sealer and ECR.

Long-term follow-up is particularly important because ECR may recur or progress despite apparently satisfactory initial repair. Retrospective studies with extended follow-up demonstrate that tooth survival and disease arrest cannot be assumed from short-term clinical or radiographic findings.[7]Consequently, the ultimate outcome of the present case should be reported only after the actual follow-up data are incorporated.

CONCLUSION

This case demonstrates the complexity of managing a previously treated tooth presenting with concomitant external cervical resorption, a large periapical lesion and extruded endodontic sealer. CBCT-based three-dimensional assessment was important for treatment planning, while surgical access enabled direct management of the cervical resorptive defect, periapical pathology and extruded material. The case supports an individualised, tooth-preserving approach in appropriately selected patients but does not establish surgical repair as universally predictable. The presence of extruded sealer should not be interpreted as the cause of ECR without supporting evidence. Definitive assessment of treatment outcome requires adequate clinical and radiographic follow-up.



Figure 1. Preoperative clinical and radiographic assessment.

Clinical and radiographic assessment of the previously treated anterior tooth demonstrating the preoperative condition, large periapical radiolucency and extruded endodontic material. CBCT images demonstrate the external cervical resorptive defect and its three-dimensional relationship with the root and surrounding structures.



Figure 2. Surgical management.

Intraoperative photographs demonstrating surgical flap reflection and exposure of the affected root surface, identification and debridement of the external cervical resorptive defect, management of the periapical lesion and removal of extruded endodontic material.



Figure 3. Postoperative assessment.

Postoperative clinical photograph demonstrating flap repositioning and suturing, together with postoperative periapical radiographs demonstrating the treated region.

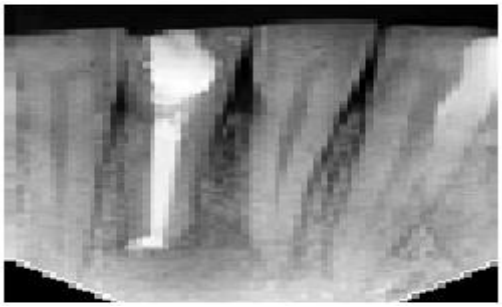


Figure 4. year Follow up

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