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Comprehensive Management Of External Cervical Resorption: A Case Report And Long-Term Outcome

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Abstract
External cervical resorption (ECR) is a challenging and often aggressive dental pathology characterized by the progressive loss of hard dental tissues at the cervical region of teeth. Early detection and correct diagnosis are essential to preserve the structure and function of the involved tooth. This case report presents a tooth with ECR, detailing diagnostic steps, choice of treatment modalities, and a long-term follow-up demonstrating arrest of the resorptive lesion and restoration of structural integrity. The report also reviews current classification systems and materials used for management[1]. The outcome suggests that a combined conservative and surgical approach, with appropriate biomaterials and imaging, can yield favourable prognosis in moderate-to-severe ECR cases.
Keywords: *External Cervical Resorption; Diagnosis; Classification; CBCT; Mineral Trioxide Aggregate; Biodentine; Treatment Outcome*

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I. Introduction

External cervical resorption (ECR) is an uncommon, but aggressive, form of tooth resorption that originates on the outer surface of the tooth root, typically in the cervical area. It is characterized by the progressive loss of tooth structure, often starting just below the epithelial attachment. ECR is notoriously difficult to diagnose in its early stages due to its asymptomatic nature. This case report details the surgical and endodontic management of a tooth with ECR.

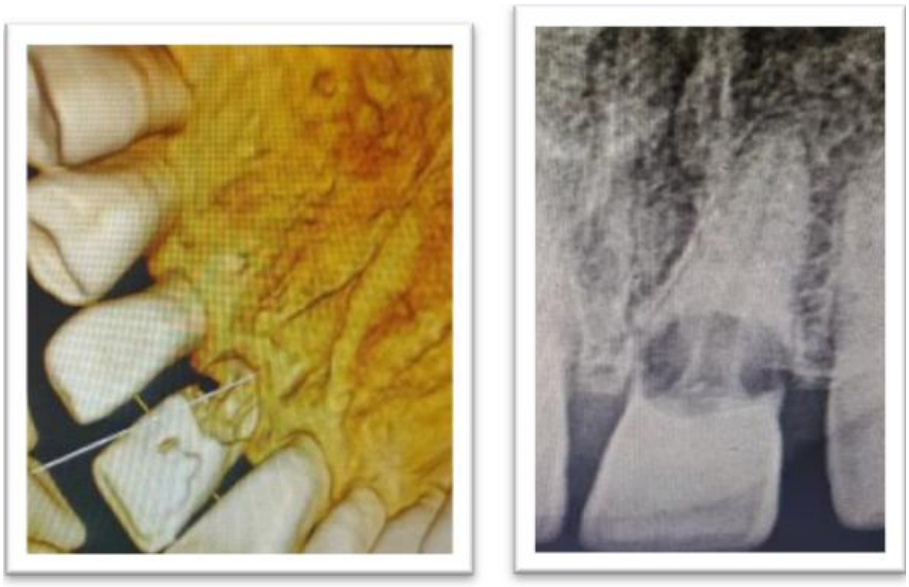
Introduction to External Cervical Resorption

External cervical resorption (ECR) is a challenging and often asymptomatic form of pathological root resorption that begins on the external surface of a tooth, typically near the gum line. This progressive destruction of dental hard tissue is initiated by damage to the periodontal ligament and cementum, which exposes the underlying dentin to the activity of osteoclasts. ECR can advance significantly before a patient experiences any discomfort, with a pink discoloration on the tooth surface in the esthetic zone sometimes being the first observable sign. Predisposing factors for ECR are often cited, including orthodontic treatment and dental trauma, although in many cases, the cause remains unknown, leading to the term "idiopathic invasive cervical resorption." Historically, diagnosis has relied on conventional radiographs, but advancements in imaging have made Cone-Beam Computed Tomography (CBCT) the gold standard for accurately assessing the three-dimensional extent of the lesion, which is crucial for effective treatment planning[2].

This article presents a comprehensive overview of ECR by detailing two distinct clinical cases, highlighting different diagnostic and management protocols. The case demonstrates a successful surgical and endodontic approach for a severe ECR lesion.

II. Case Presentation

A patient presented with a dental condition on tooth number **21**, as seen in the initial pre-operative radiographs and Cone Beam Computed Tomography (CBCT) images. The images showed a significant resorption lesion in the cervical region of the tooth.



PR-OPERATIVE CBCT AND RADIOGRAPH

Treatment Protocol

The treatment involved a multi-step approach combining endodontic therapy and surgical intervention. The initial steps focused on addressing the internal root canal system before tackling the external lesion.

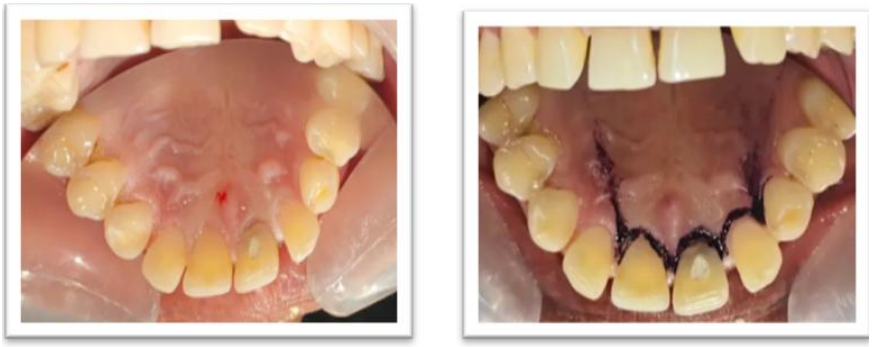
- **Working Length Determination**: The first step was to establish the working length of the root canal. This is a standard procedure in endodontic treatment to ensure the entire length of the canal is cleaned and shaped effectively.

Working Length Determined

- **Sectional Obturation**: Following the preparation of the root canal, a sectional obturation was performed on tooth 21. This involved sealing the apical portion of the root canal. This step is critical to prevent leakage and protect the periapical tissues from infection. [4]

Sectional Obturation Done Irt 21

- **Surgical Intervention**: The external resorption lesion required surgical access. After administering local anesthesia, an incision was made and a flap was raised to expose the affected area. The extent of the lesion was then visible, allowing for a thorough debridement.



Incision Marking Done

- **Curettage**: Once the lesion was exposed, meticulous curettage was performed to remove all resorptive tissue. This step is vital to eliminate the cells responsible for the resorption process. The goal is to ensure a clean, healthy surface for subsequent repair.

Flap Raised And Curettage Done In Relation 21

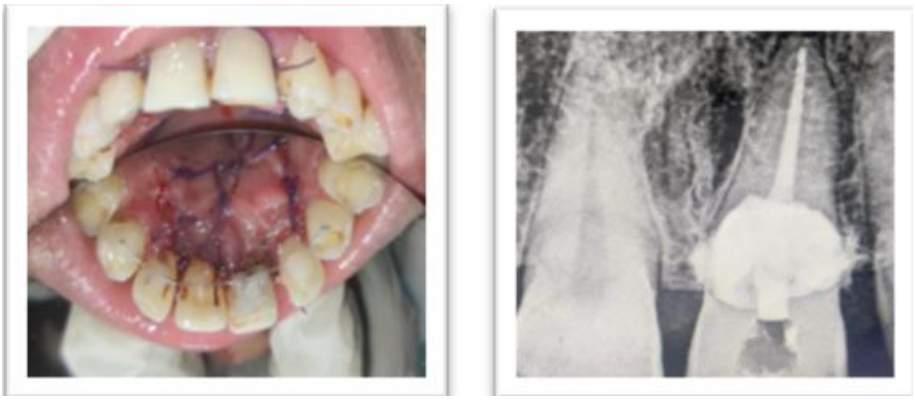
- **MTA Placement**: Following the curettage, Mineral Trioxide Aggregate (MTA) was placed over the lesion on tooth 21. MTA is a biocompatible cement used in dentistry for its sealing ability and its capacity to stimulate tissue repair. Its use here was intended to fill the defect created by the resorption and to promote healing of the surrounding bone and cementum [5].

MTA Placement Done Irt 21

- **PerioCOL Placement**: A PerioCOL membrane was placed over the treated area. PerioCOL is a collagen membrane used in guided tissue regeneration procedures. Its function here was to serve as a barrier, preventing the rapid growth of epithelial cells into the defect and allowing for the slower regeneration of periodontal ligament and bone. This step is crucial for the long-term success of the procedure.

Periocol Placement Over The External Cervical Lesion

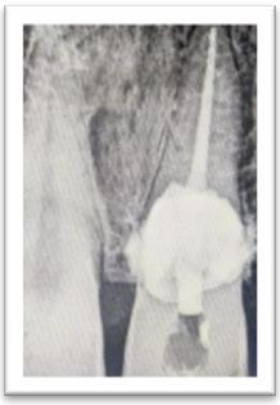
- **Suturing**: The surgical flap was then repositioned and sutured to close the site. Proper suturing is essential for wound stability and to facilitate healing.



Suture Placement And Post-Operative Radiograph

Follow-up and Outcome

Post-operative radiographs were taken to document the successful placement of the MTA and the closure of the defect. A six-month follow-up radiograph was also obtained, which showed no signs of recurrent resorption and confirmed the successful repair of the tooth structure. The combination of endodontic treatment and surgical repair proved to be an effective strategy for managing this case of external cervical resorption[6].



Six Months Follow Up

III. Discussion

External cervical resorption represents one of the more elusive forms of root resorption, not only because its etiology remains only partially understood, but also due to its often asymptomatic nature until more extensive destruction has occurred. The literature indicates that damage to the cementum or the amelocemental junction, trauma, orthodontic treatment, internal bleaching, or periodontal procedures can act as predisposing factors. Accurate imaging is crucial: while periapical radiographs remain a first line tool, cone-beam computed tomography (CBCT) offers superior information regarding the lesion height, its circumferential spread, and proximity to the root canal.

Classification systems such as Heithersay's 2D scheme and more recent 3D classification models (e.g. Patel et al.) help guide treatment planning and prognosis. In general, smaller, more superficial lesions (Heithersay class I or II; lower extent in 3D systems) can often be managed conservatively, sometimes with internal or external debridement, restoration of the defect using MTA, Biodentine, or other bioceramics. More extensive lesions often require surgical access, sometimes combined with root canal treatment, removal of resorptive tissue, and restoration. Prognosis is influenced by the extent of the lesion, the remaining tooth structure, the location (anterior vs posterior), and the material used[7].

In this case, the chosen treatment strategy was selected based on imaging showing moderate extension, preserving vitality (if possible), using biomaterials conducive to repair (such as MTA/Biodentine), and following the lesion over time to verify arrest of resorption. Long-term follow-up is necessary because even successfully treated lesions can relapse or progress if any portals of entry remain, or if there is inadequate sealing. The literature shows variable long-term survival, often decreasing over 5-10 years depending on class of lesion, but the outcome is promising if early diagnosis and correct case selection are done[8].

IV. Conclusion

This case highlights the importance of a comprehensive approach to managing advanced cases of external cervical resorption. The successful outcome demonstrates that even extensive lesions can be treated effectively by combining endodontic procedures to protect the pulp with surgical debridement and regenerative materials like MTA and PerioCOL[9]. Early diagnosis and timely intervention are key to preserving tooth structure and function in patients affected by this condition[10-12].

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