



Clinical Chronicles: A Case Report on Pink Tooth of Mummery

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Internal tooth resorption is a subtle proceeding typically occurring in teeth with a history of trauma, chronic pulpal inflammation, or caries-related issues. It is frequently observed in anterior teeth that are more vulnerable and susceptible to injury, but can also affect posterior teeth, often due to pulp involvement in caries. This case report illustrates the handling of a resorption in the cervical third of the root. A 28-year-old female patient was referred for endodontic and esthetic treatment for her primary complaint of pink spot staining in her upper left central incisor's crown. The tooth had symptomatic apical periodontitis. Final Diagnosis was Class 4 invasive cervical resorption. This case study outlines the effective management of an extensive internal root resorption using a non-surgical approach and the application of MTA as repairing material with thermo-plasticized gutta-percha as an obturation material. The treatment resulted in the resolution of symptoms and the restoration of periapical tissues. Timely detection, addressing the underlying cause, and effective care of the invasive cervical resorption are essential for achieving a favorable treatment outcome. Obtaining positive results required a patient-centered approach, well-planned therapy, and an accurate diagnosis.

Keywords: Invasive Cervical Resorption; Pink Spot; Pulpitis; Trauma

Introduction

Resorption is characterized as a process that can arise from a normal or aberrant mechanism and result in the depletion of dentin, cementum, or bone [1]. Two primary categories of tooth resorption have been identified by Andreasen [2], each having their respective sub-classifications: internal (inflammatory, replacement) and external (surface, inflammatory, and replacement). Internal root resorption is the term used to describe the progressive degradation of hard tissue inside the root canal space and its walls as a result of clastic processes [3]. Several hypotheses have been suggested as the mechanisms of root resorption such as absence of the remnants of Hertwig's epithelial root sheath (HERS) and the absence of some intrinsic factors in cementum and predentin such as amelogenin or osteoprotegerin (OPG) [4]. Usually affecting mandibular molars and incisors, this syndrome is identified by a radiolucent area encircling the pulp cavity. Internal root resorption may be the result of trauma, orthodontic procedures, or infections [5].

Resorption of permanent teeth is considered an abnormal occurrence, and if not addressed, will eventually cause damage to the tooth structure, potentially resulting in tooth extraction. Pathological root resorption is categorized according to the site of its occurrence. Internal resorption occurs within the root canal system, and pulp tissue is involved in this process. Thus, the resorption process is halted when pulp tissue is removed by traditional root canal therapy. On the other hand, external resorption takes place on the root exterior. It can be classified as an invasive cervical resorption, also called external cervical resorption [6].

Internal resorption usually has no sign and in a routine radiography, it is recognized as a uniform enlargement of the pulp canal. If it is diagnosed and treated at an early stage, its propagation and subsequent perforation could be prevented. In case of perforation, the prognosis would be poor. For diagnosis of these lesions, the conventional or digital radiography is usually helpful [7]. CBCT images are one of the most reliable tools used to study the anatomy, morphology of root canals and complications such as vertical root fractures and root



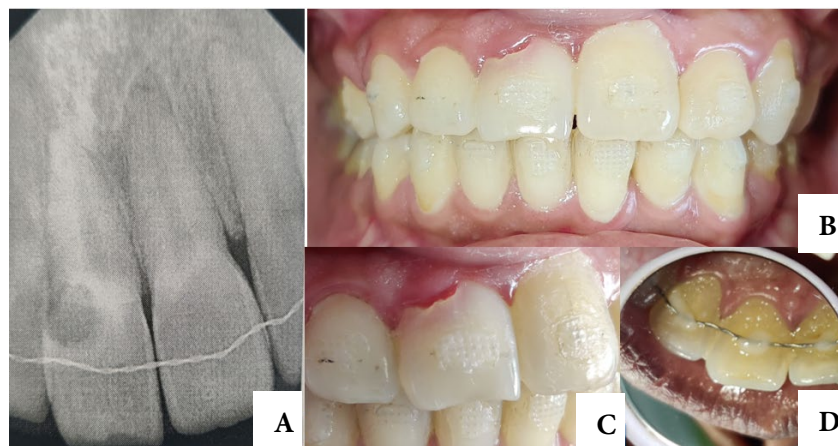


Figure 1. A) Pre-operative periapical radiograph showing internal tooth resorption within tooth number 11; B) Intraoral clinical picture showing the profile view; C) Intraoral clinical picture showing the pink tooth of Mummery of tooth number 11; D) Intraoral clinical picture showing the palatal view of tooth number 11

resorption, which have reduced the several limitations of two-dimensional images and which come with less imposed radiation and higher resolution in comparison with CT images [8].

Handling internal root resorption poses a challenge for endodontists. This disorder may arise from caries, trauma such as an accidental impact, or persistent inflammation of the pulp. Due to their susceptibility to trauma, anterior teeth are more frequently affected by internal root resorption; nevertheless, posterior teeth may also experience it, frequently as a result of pulp involvement in caries. Timely identification, elimination of the underlying cause, and effective management of the affected root are crucial for attaining favorable treatment outcomes. There are two separate stages of resorption: the disintegration of the inorganic mineral structure, followed by the organic matrix breakdown [9]. Resorption of the inflamed interior dentin is halted during root canal replacement resorption after the formation of hard tissue resembling cementum or bone [10]. Root resorption caused by internal inflammation can appear as perforating or non-perforating. Although there may be a visible pink spot a reddish zone that signifies granulation tissue visible through the resorbed area the illness often exhibits no symptoms in clinical settings. Internal resorption is mainly diagnosed by radiographic imaging. The initial root canal morphology is distorted as it exhibits a round-to-oval radiolucent extension of the pulp space with smooth and well-defined margins [2, 5]. Internal resorption can be identified by light and electron microscopy, radiography methods such as conventional and cone-beam computed tomography (CBCT), and visual evaluation based on differences in tooth crown color [11, 12]. Zinc oxide eugenol, zinc acetate cement, amalgam alloy, composite resin, mineral trioxide aggregate (MTA), glass ionomer cement, super ethoxy benzoic acid, hydrophilic plastic polymers, and thermoplasticized gutta-percha

applied by injection or condensation techniques are some of the materials available for treating internal root resorption. Due to structural weakening and potential periodontal involvement, perforating internal resorption can complicate endodontic treatments. However, the choice of biomaterial for treatment can significantly impact prognosis. Mineral trioxide aggregate (MTA) is commonly preferred due to its biocompatibility, sealing capacity, and ability to promote osteogenesis and cementogenesis, especially in conjunction with thermoplasticized gutta-percha obturation procedures [13, 14].

Case report

A 28-year-old female patient arrived at the department stating that she had been experiencing minor pain in the upper right front tooth area for approximately a month. She had no chronic medical conditions, thus her medical history was unremarkable. A five-year course of orthodontic treatment was suggested by past dental history. A rough edge on tooth 11's buccal surface that extended to the disto-proximal of the tooth was discovered during a clinical examination. The patient did not report any associated history of trauma, accident or fall. The tooth's surface underneath this jagged edge exhibited a multiplying tissue. The radiographic evaluation revealed an internal resorption-related radiolucent region in the cervical third of the central incisor's crown. Moreover, tooth #11 was linked to periodontal ligament widening. The decision to proceed with endodontic therapy for tooth #11 was prompted by the finding of internal resorption along with symptomatic apical periodontitis (Figure 1).

Informed written consent was obtained from the patient. Since the tooth was non-vital, it was accessed without local anesthesia.

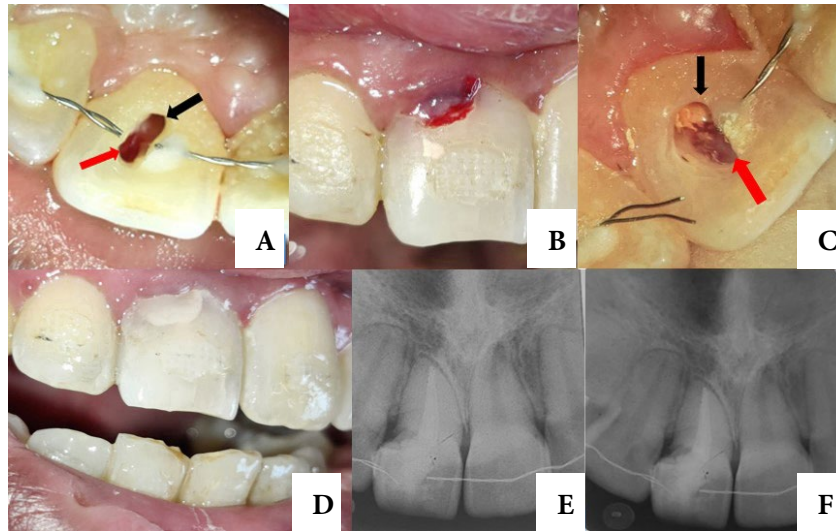


Figure 2. A) Intraoral clinical picture depicting access opening as pointed by the black arrow and the resorption site pointed by the red arrow; B) Defective site on the labial aspect of tooth number 11; C) The palatal view depicting obturation as pointed by the black arrow and the perforated site pointed by the red arrow; D) The defective site is restored with MTA, glass ionomer cement and composite resin; E) Immediate post-treatment periapical radiograph; F) Periapical radiograph at 6 months follow-up

The procedure commenced with the initiation of an antibacterial mouth rinse (0.12% chlorhexidine). During the first session, the biomechanical preparation of the tooth was started, and a radiograph was taken to ascertain the working length using a #15 K-file. Once the working length was determined and the apical patency had been achieved, the irrigation was carried out using 2 mL of 3% sodium hypochlorite and it underwent ultrasonic activation, followed by gentle cleansing with 2-3 mL of 0.9% (w/v) normal saline. The tooth was further prepped up to a #70 K-file with intermittent irrigation to ensure canal lubrication at the follow-up session, which took place after two days. The canals were cleaned thoroughly with 0.9% normal saline (w/v), the master cone was then selected according to the biomechanical preparation done. Granulation tissue was carefully removed from within the root canal, and bleeding was controlled. The resorptive defect was covered with MTA (Dentsply Sirona Endodontics, Tulsa, OK, USA). After receiving root canal therapy, a bioceramic sealer (MTA Fillapex; Angelus, Londrina, PR, Brazil) was carefully inserted into the canal and distributed evenly. The canal was then filled using the heated vertical condensation process. A light cure glass ionomer cement (Prevest Denpro, Jammu, India) was used as an interim restoration. The temporary restoration was then positioned, and a damp cotton was placed over the MTA to aid the correct setting. Two days later, at the third visit, the MTA setting was assessed, and the patient was referred for dental restoration. Final restoration using composite resin (Spectrum Universal Composite, Dentsply Sirona) was used to repair the damaged tooth. On subsequent follow-up visits, the clinical and radiographic signs and symptoms were evaluated. The associated

gingiva continued to function normally for the first two weeks following therapy. Normal periodontal probing depths during the clinical evaluation indicated attachment gain. The patient reported no discomfort or discoloration and continued to be asymptomatic with a functioning tooth throughout a six-month recall period. A healthy periapical region and halted resorption were observed in the radiographic examination. This case demonstrates the success of the selected intervention managed a complicated invasive cervical root resorption lesion while maintaining patient welfare, function, and esthetics (Figure 2).

Discussion

The literature states that granulation tissue affecting a necrotic area of the pulp close to the crown causes Mummery's pink tooth. The pink tooth of Mummery, so named in honour of the 19th-century anatomist James Howard Mummery, is a tooth that has a pinkish tint. It's thought that a pink tooth develops from internal dentin loss, which leaves a large pulp space open to more blood vessels, giving the tooth a pinkish tint. Blood that escapes from a damaged vessel and becomes trapped inside the pulp chamber, giving off a pink hue, is known as a pulpal haemorrhage. As a result, internal resorption in a tooth's coronal region is typically indicative of pink tooth [3]. Teeth having either internal root resorption or external cervical resorption are frequently found to have this disease. But in this specific case, the pulp tissue close to the crown was still vital, and there were no clinically discernible indications of granulation tissue. Moreover, X-rays showed no discernible indications of

resorptive lesions [15]. The primary etiology of internal resorption is excessive orthodontic forces. In orthodontics, root resorption is termed as induced inflammatory resorption. It represents a type of pathological root resorption where orthodontic forces are applied to the teeth, leading to the removal of hyalinized areas in the periodontal region [16].

Considerations for management halting the resorption process necessitates the removal of the causative tissue. This procedure entails surgically accessing the lesion to enable direct observation and mechanical elimination of the resorptive granulosomatous tissue using a low-speed round bur [17].

Another treatment option for severe root resorption cases is auto-transplantation which was demonstrated to be a potential treatment for tooth replacement, in case of trauma, agenesis, or premature loss of a tooth caused by caries. It is a viable option for young patients and for those who don't have another clinical alternative; it is a reliable technique that has a success percentage of 74-100% [18].

Restorative considerations A resin-modified glass ionomer cement material was selected for repairing the defect due to its capability to form a chemical bond with dentinal structure and suitability for subgingival placement. Using resin-modified glass ionomer has also demonstrated a reduction in dentin matrix metalloproteinase-8 expression, which can aid in preventing future resorption [13]. Because of their efficient sealing and biocompatibility, bioceramic materials such as calcium silicate-based agents or MTA are currently suggested for the treatment of invasive cervical resorption lesions. Class 3 and Class 4 lesions are distinguished by Heithersay's categorization [19], which involves significant dentin loss, replaced by resin-modified glass ionomer cement restorative material.

When restoring teeth with Class 3 or 4 invasive cervical resorption lesions, dentists should avoid crown preparation, as it removes additional tooth structure, resulting in a substantial reduction in supportive dentin volume by 30% to 40%. This significant dentinal loss weakens the tooth structure [20].

When it comes to periodontal issues, external therapy for cervical root resorption usually entails the placement of a biocompatible restoration while maintaining the biological width the distance the junctional epithelium and the surface of the tooth. To expose sufficient dental tissue for restoration without jeopardizing periodontal health, operations like crown lengthening or orthodontic extrusion may be necessary. Obtaining informed consent should include discussing issues regarding the biological width with the patient.

Regarding long-term management, regular monitoring of invasive cervical resorption cases by periodic periapical imaging is crucial due to the possibility of recurrence. This monitoring can

be incorporated into regular appointments. Since the long-term results of these lesions are unpredictable, it is crucial to educate the patient about the risks, advantages, and available treatments including the option of foregoing therapy altogether [21].

The following were the reported case's most important treatment outcomes:

- The stopping of the resorption process,
- Halting further resorption, and
- Enhancing appearance with reasonable clinical outcomes as a similar case report [22].

The stated diagnosis was asymptomatic irreversible pulpitis. The entire granulation tissue was removed from the resorption region, and MTA was used for sealing the region. After that, the root canal was prepared and obturated chemo-mechanically. The filling of the resorption area remained intact, with no clinical indications or symptoms, and no hypodense areas in the cervical region in imaging after two years of clinical follow-up and CBCT assessment. Invasive cervical root resorption is a unique and often confusing clinical syndrome that is seen in the field of endodontics. Due to its gradual progression and potential to cause significant harm to tooth structure, it requires careful assessment and decision making between nonsurgical and surgical treatments [23]. Because of its complexity, invasive cervical root resorption emphasizes the need for a comprehensive, precise diagnostic strategy that combines clinical evaluations with cutting-edge imaging technology. Implementing a comprehensive approach is necessary for enhancing diagnostic accuracy and facilitating the creation of customized treatment plans [24].

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Conclusions

Prompt recognition, elimination of the underlying cause, and apt management of the affected tooth are vital for ensuring a favorable treatment outcome. Internal resorption, though uncommon, begins within the root canal and causes damage to nearby tooth structures. Internal root resorption can be effectively controlled by conventional root canal therapy and severing the blood supply to the resorptive tissues. Setting up routine follow-up appointments is crucial for monitoring the healing process and assessing the tooth's prognosis.

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Conflict of interest

None.

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Authors' contributions

SK: Conceptualization, Writing the Original Draft, and Review/Editing. JM: Cowriting the Original Draft, preparing the Tables and Review/Editing. SS/AI/AP: Co-writing the Original Draft, and Review/Editing. All authors contributed to the study and approved the final manuscript.

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