



Root Resorption: Case Series, Systematic Review Meta-Analysis: A Database Research

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ABSTRACT

This case report presents the management and outcome of a 30-year-old male patient who presented with chief complaint of pain in the left lower back region of the jaw. Clinical examination and intraoral periapical radiographs (IOPA) revealed root resorption of the mesial root of tooth #36. The tooth was surgically extracted and curatted, and the patient was followed up for four weeks. The post-extraction healing process was uneventful, with successful resolution of symptoms and no complications observed. **Introduction:** Root resorption is a pathological condition characterized by the progressive loss of tooth structure, resulting from an inflammatory or non-inflammatory process. It can cause significant pain and functional impairment. This case report highlights the diagnosis and successful management of root resorption in the mesial root of tooth #36 in a young adult male. **Case presentation:** A 30-year-old male patient visited the dental clinic with a chief complaint of persistent pain in the left lower back region of the jaw. The pain was intermittent, exacerbated by biting and chewing, and had been present for the past two weeks. The patient had no history of trauma to the affected tooth or any systemic health issues. **Clinical examination:** Upon examination, localized tenderness and swelling were noted in the left mandibular molar region. Tooth #36 exhibited mobility and was sensitive to percussion. Intraoral examination revealed no signs of caries or periodontal disease in the region.

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Diagnostic Findings: Intraoral periapical radiographs (IOPA) (Fig.1) were taken, which revealed significant root resorption of the mesial root of tooth #36. The resorptive defect appeared to involve the cementum and dentin, compromising the structural integrity of the tooth. **Diagnosis:** Based on clinical and radiographic findings, a diagnosis of external root resorption of the mesial root of tooth #36 was established. **Treatment plan:** Given the severity of the root resorption and the poor prognosis of the tooth, the treatment plan involved the surgical extraction of tooth #36. After administration of local anesthesia, atraumatic extraction of the affected tooth was performed. The surgical site was then carefully curetted to remove any remnants of the resorbed root structure. (Fig 2,3,4,5). **Postoperative follow-up:** The patient was advised to follow postoperative care instructions, which included the use of prescribed analgesics and a soft diet for the first few days. The patient was scheduled for a

follow-up visit after four weeks. **Outcome:** At the four-week follow-up, the patient reported a complete resolution of pain and swelling in the left lower molar region. Intraoral examination revealed uneventful healing of the surgical site, with no signs of infection or other complications. The patient expressed satisfaction with the outcome, and no further intervention was required. **Discussion:** Root resorption is a challenging condition that requires timely diagnosis and appropriate treatment to prevent further damage to the affected tooth and surrounding tissues. In this case, the early detection of mesial root resorption of tooth #36 allowed for timely extraction, resulting in a successful outcome and alleviation of the patient's symptoms. **Conclusion:** This case report highlights the successful management of root resorption in the mesial root of tooth #36 in a 30-year-old male patient. Timely diagnosis and atraumatic surgical extraction, followed by proper postoperative care, led to an uneventful healing process with satisfactory results. Further research and case studies are needed to enhance our understanding of root resorption and optimize treatment outcomes.

Figure 1



Figures 2, 3, 4, 5





TITLE: "CLINICAL INSIGHTS AND MANAGEMENT STRATEGIES FOR ROOT RESORPTION: A SYSTEMATIC REVIEW OF CASE REPORTS"

INTRODUCTION

Root resorption is a multifactorial pathological process that can lead to the loss of tooth structure, compromising the stability and functionality of affected teeth¹. It occurs due to the breakdown and destruction of root surfaces, either internally (internal root resorption) or externally (external root resorption). This dental condition can result from various factors, including traumatic injuries, orthodontic treatment, infections, and inflammatory processes². The prevalence and severity of root resorption vary, making its diagnosis and management challenging for dental professionals³.

Systematic reviews are valuable tools in evidence-based dentistry as they synthesize and critically appraise the available literature, providing comprehensive insights into the current state of knowledge on a specific topic⁴. By pooling data from multiple studies, systematic reviews offer a more robust and reliable understanding of the prevalence, risk factors, diagnostic methods, and treatment modalities related to root resorption⁵.

The aim of this systematic review is to examine the existing literature on root resorption to consolidate evidence, identify knowledge gaps, and propose recommendations for its diagnosis and management⁶. By analyzing a wide range of studies, including case reports, cohort studies, and randomized controlled trials, this review seeks to present a comprehensive overview of the epidemiology, etiology, and clinical approaches related to root resorption.

METHODOLOGY

This systematic review aims to comprehensively evaluate the literature on root resorption. A systematic search will be conducted on electronic databases (PubMed, Google Scholar, etc.) for studies published between 2013 and 2023, focusing on root resorption cases. Inclusion criteria will require case reports or case series that discuss root resorption diagnosis, treatment, and outcomes. Studies published in English and accessible in full-text format will be considered. Two independent reviewers will screen titles, abstracts, and full texts, resolving disagreements through discussion or third-party involvement. Data will be extracted using a standardized form, including patient demographics, clinical presentation, diagnostic approaches, treatment modalities, and outcomes.

RESULTS

The systematic review identified a total of 10 articles that met the inclusion criteria and were included in the analysis. These articles comprised case reports and case series that provided valuable insights into the diagnosis, treatment, and outcomes of root resorption cases.

Table 1: Included Articles and Their Details

S.no	Author(s)	Year	Demographics (Age, Gender)	Clinical Presentation	Diagnostic Approaches	Treatment Modalities	Outcome
1	Mittal S et al ⁷	2014	35, male	Caries in tooth #22,23	Clinical examination, Radiographs	Endodontic therapy	Successful healing without complications
			38, female	Gross decay to 26,25	IOPA	Endodontic therapy with MTA plug	Successful healing without complications
			25, male	Pain in tooth 37	IOPA	Endodontic therapy with MTA plug	Successful healing without complications
2	Kulkarni S et al ⁸	2016	45, Female	Pain in teeth #21,22,23	IOPA	Endodontic therapy followed by fibre post	Arrested resorption; Tooth retained
3	Xu and Zhou et al ⁹	2018	15, Female	Caries in tooth #15	Clinical examination, IOPA	Pulpectomy with MTA	Resolution of symptoms
4	Nagas et al ¹⁰ .	2018	21, Female	Trauma to teeth #11, 21	IOPA, CBCT	Endodontic therapy with MTA	Successful healing without complications
5	Dusane et al ¹¹	2018	23, female	Mobility and swelling in tooth #11, 12	IOPA, Clinical examination	Calcium hydroxide pulpotomy	No follow up
6	M S Prathap et al ¹²	2020	35, male	Asymptomatic tooth #27	Cone-Beam CT, Clinical examination	Endodontic therapy with MTA	Tooth retained
7	Levy H et al ¹³	2021	23, Male	Lower incisors	IOPA, Vitality testing	Mineral trioxide aggregate apexification	Tooth retained
			21, female	Trauma to tooth #21	IOPA, Cone-Beam CT	Endodontic therapy with fast setting calcium silicate	Root resorption halted; Tooth retained
8	Wang J et al ¹⁴	2022	23, female	Trauma to tooth 12	IOPA, Cone-Beam CT	Endodontic therapy with fast setting calcium silicate and	Root resorption halted; Tooth retained

S.no	Author(s)	Year	Demographics (Age, Gender)	Clinical Presentation	Diagnostic Approaches	Treatment Modalities	Outcome
						MTA	
9	Hsieh et al ¹⁵	2022	36, Female	Pain and swelling in tooth #41	Clinical examination, Radiographs	Endodontic therapy with calcium hydroxide and MTA	Tooth retained
10	Ghosh et al ¹⁶	2023	40, male	Trauma to tooth #35	IOPA, Cone-Beam CT	Endodontic therapy with MTA	Satisfactory and functional outcome
			27, female	Trauma to tooth #11	IOPA, Cone-Beam CT	Endodontic therapy with MTA	Satisfactory and functional outcome

DISCUSSION

The systematic review included ten case reports on root resorption, providing valuable insights into the clinical presentations, diagnostic approaches, treatment modalities, and outcomes associated with this dental condition. The reviewed cases exhibited a diverse range of demographics, including various age groups and genders, and presented with different clinical manifestations of root resorption.

Clinical presentations of root resorption in the included cases varied, ranging from caries-related issues, gross decay, and pain to mobility and swelling in affected teeth. These findings align with previous studies on root resorption, which have shown that various factors, such as trauma, caries, and orthodontic treatment, can contribute to the development of this condition (Nagas et al., 2018¹⁶; Wang et al., 2022⁷).

The most commonly reported diagnostic approaches were intraoral periapical radiographs (IOPA) and cone-beam computed tomography (CBCT), which proved essential in identifying the extent and type of root resorption. The use of IOPA and CBCT is consistent with recommendations from previous studies, highlighting the significance of advanced imaging techniques for accurate diagnosis and treatment planning in root resorption cases (Xu and Zhou, 2018¹⁵; Wang et al., 2022⁷).

Endodontic therapy was the predominant treatment modality adopted in these cases, with mineral trioxide aggregate (MTA) and calcium hydroxide being commonly used materials for root canal treatment. MTA has demonstrated favorable biocompatibility and sealing properties, facilitating successful healing without complications in several cases (Mittal et al., 2014⁹; Levy et al., 2021¹⁰). Additionally, fast-setting calcium silicate-based materials have shown promising outcomes in arresting root resorption and preserving the affected teeth (Wang et al., 2022⁷).

The outcomes of the treatments were generally positive, with successful healing and resolution of symptoms observed in most cases. The majority of the treated teeth were retained, contributing to satisfactory esthetic and functional outcomes. This underscores the importance of early detection and timely intervention in managing root resorption cases. These findings are consistent with previous studies that have demonstrated the significance of appropriate and timely treatment for successful outcomes in root resorption cases (Kulkarni et al., 2016¹³; Hsieh et al., 2022¹²).

It is noteworthy that follow-up duration and assessment were variable among the reviewed case reports. Some cases lacked follow-up data, making it challenging to determine the long-term stability and prognosis of the treated teeth fully. Future studies should aim to include more extended follow-up periods to better understand the long-term outcomes of various treatment modalities for root resorption cases.

Limitations of this systematic review include the relatively small number of case reports available in the literature, which may limit the generalizability of the findings. Additionally, the absence of standardized reporting for case reports might have impacted the quality and consistency of data extraction. Nevertheless, the systematic review provides valuable insights for clinicians in managing root resorption cases effectively and underscores the need for further research in this area.

CONCLUSION

This systematic review of ten case reports on root resorption highlights the diverse clinical presentations and successful management strategies employed to treat this dental condition. The utilization of diagnostic tools such as IOPA and CBCT proved instrumental in accurate diagnosis and treatment planning. Endodontic therapy, particularly with MTA and fast-setting calcium silicate-based materials, demonstrated favorable outcomes in arresting root resorption and preserving affected teeth. However, the limited follow-up data in some cases necessitates further research to assess the long-term stability and prognosis of treated teeth. Overall, this systematic review provides valuable insights for clinicians in managing root resorption cases effectively.

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