International Journal of Science and Research (IJSR)
ISSN: 2319-7064
Impact Factor 2024: 7.101

Orthodontic Preparation and Endodontic Approach in the Treatment of Invasive Cervical Resorption

Gusiyska A[1], Gavrilov G[2]

[1]Department of Conservative Dentistry, Faculty of Dental Medicine, Medical University of Sofia, Bulgaria
[2]Private Orthodontic Practice "Valor", Sofia, Bulgaria

Abstract: ***Invasive cervical resorption (ICR) is a pathological process characterized by the progressive loss of dental hard tissues due to odontoclastic activity, usually initiated at the cervical region of the root. Its etiology is multifactorial and may involve trauma, orthodontic treatment, intracoronal bleaching, or idiopathic causes. The management of ICR presents a significant clinical challenge due to the complex anatomy of the resorptive defect and its proximity to the periodontal attachment apparatus. Early diagnosis through detailed clinical examination and advanced imaging techniques such as cone-beam computed tomography (CBCT) is crucial for accurate classification and treatment planning. Successful management of ICR requires an interdisciplinary approach that integrates orthodontic, endodontic, and restorative principles. Orthodontic preparation can facilitate access to the resorptive lesion, improve visualization, and enable optimal isolation and restorative control. Controlled orthodontic extrusion may be indicated to reposition the lesion coronally, allowing conservative access and recontouring of the defect margins while preserving biologic width. From an endodontic perspective, treatment aims to eliminate microbial contamination, seal the communication pathways between the resorptive defect and the root canal system, and restore the tooth's structural integrity. Bioceramic materials and adhesive restorative techniques have shown promising results in promoting biological compatibility and long-term sealing. This article reviews the diagnostic considerations, classification systems, and combined orthodontic–endodontic management strategies for invasive cervical resorption. Emphasis is placed on the sequence of interdisciplinary treatment, material selection, and minimally invasive approaches that support long-term tooth preservation and periodontal stability.***

Keywords: adhesive restoration, bioceramic materials, endodontic treatment, invasive cervical resorption, orthodontic extrusion

1. Introduction

Invasive cervical resorption (ICR) - often referred to as external cervical resorption (ECR) - represents a formidable clinical challenge within both restorative and endodontic dentistry. This pathological process begins in the cervical region of the tooth, directly beneath the epithelial attachment, where resorptive activity gradually invades the hard dental tissues, ultimately compromising the root's structural integrity and possibly the pulp. A comprehensive review of the literature emphasizes that the integrity of the cemento-enamel junction, especially its protective cementum layer, is often compromised, thus rendering the dentine vulnerable to clastic cell attack. [1][2]

The aetiology of ICR is recognised as multifactorial: trauma, intracoronal bleaching, orthodontic movement and restorative interventions have all been implicated as potential precipitating factors. While the causal relationship is unclear, studies suggest that orthodontic treatment often contributes to ICR in a substantial proportion of ECR cases. [2][3][4]. This underlines the importance of an interdisciplinary mindset in both diagnosis and treatment planning. Diagnostic advancement, particularly the widespread utilisation of cone-beam computed tomography (CBCT), has facilitated three-dimensional visualization of resorptive defects, their circumferential spread and depth - a critical step in treatment decision-making [5]. From a therapeutic perspective, the management of ICR often requires a combined orthodontic and endodontic approach. Orthodontic preparation, for example, by controlled extrusion or repositioning of the tooth, can enable improved access to the resorptive defect, enhance isolation, and create a more favourable restorative environment.

Orthodontic extrusion represents a valuable adjunctive procedure in the management of cervical resorptive lesions, enabling coronal repositioning of the tooth to improve access and restorative isolation while maintaining periodontal integrity [5][6]. Three main modalities have been described, each sharing a common goal—preservation of the natural tooth: 1) The classic orthodontic extrusion with brackets and NiTi wires offers controlled and biologically compatible movement, preserving the periodontal apparatus and soft tissue contour, though requiring a longer treatment period [6][7]. 2) The forced orthodontic extrusion (FOE) technique, employing composite anchorage bars and high-tension elastics, allows rapid movement of endodontically treated teeth - typically 3–6 mm within two weeks - yet demands careful monitoring to prevent root resorption and soft tissue distortion [8][9]; and 3) Surgical forced extrusion systems (e.g., Benex/AES) provide immediate vertical repositioning and aesthetic advantages but are technically demanding and indicated primarily in isolated cases with adequate root length [10].

In the present case, conventional orthodontic extrusion using bracket mechanics was selected, as it ensured gradual, controlled movement compatible with periodontal health and provided optimal coronal access for definitive restorative sealing.

Preceding orthodontic manipulation, endodontic procedures aim to eradicate microbial contamination, seal communications between the canal space and resorptive zones, and restore integrity using biocompatible materials [11]. Despite the increasing documentation of case reports and

retrospective analyses, a recent systematic review underscored the lack of high-quality evidence and emphasized the need for predictable, standardized treatment algorithms. [12][13][14]. Accordingly, the main purpose of this article is to detail current concepts in orthodontic preparation and endodontic management specific to ICR, to evaluate material selection and technique variability, and to propose a practical, evidence-informed workflow for a conservative, interdisciplinary intervention.

This article reviews the diagnostic considerations, classification systems, and combined orthodontic–endodontic management strategies for invasive cervical resorption. Emphasis is placed on the sequence of interdisciplinary treatment, material selection, and minimally invasive approaches that support long-term tooth preservation and periodontal stability.

2. Clinical Case Report / Presentation

A 45-year-old patient was referred for consultation with complaints of provoked and spontaneous pain in the lower right quadrant. The patient was unable to localize the pain precisely or identify the specific tooth involved. Intraoral examination revealed teeth #45, #46, and #47 restored with composite fillings, which had been replaced approximately two months earlier - coinciding with the onset of symptoms. The patient reported that the discomfort began shortly after these restorations were completed. Percussion testing of all teeth in the lower right quadrant elicited no pain response. However, gentle probing revealed a defect in the cervical region of tooth #47, accompanied by marked tenderness on stimulation.

The patient was referred for cone-beam computed tomography (CBCT) and a current digital periapical parallel radiograph, in addition to the panoramic radiograph presented at the first appointment. Three-dimensional analysis confirmed the presence of an invasive cervical resorption (ICR) lesion located on the mesio-lingual aspect of tooth #47. A small communication between the resorptive cavity and the pulp chamber was identified. The apical border of the lesion was approximately 1 mm below the alveolar bone level, and its occlusal border lay 1.5 mm apical to the gingival margin. The diagnosis of invasive cervical resorption was confirmed through CBCT analysis, which enabled precise assessment of lesion extent and its communication with the pulp. Although metallic restorations may produce artefacts that obscure cervical defects, recent image-processing developments - such as the automated edge-detection algorithm proposed by Khosravifard et al. have demonstrated improved visualization of resorptive lesions [15] (Figure 1,2).

Due to limited access and the inability to achieve a hermetic seal of the defect under existing conditions, an orthodontic consultation was requested. The orthodontist's evaluation found no contraindications to performing controlled extrusion of the tooth. It was explained to the patient that the procedure would require removal of the existing restoration and possibly some surrounding hard tissue to achieve adequate access and isolation. Following a comprehensive discussion of the diagnosis, treatment options, and prognosis, an interdisciplinary treatment plan was proposed that combined endodontic, orthodontic, and restorative interventions to preserve tooth #47.

Figure 1: Intraoral situation

3. Treatment Plan

The case management followed an interdisciplinary plan involving endodontic, orthodontic, and restorative steps. The objectives were to eliminate the endodontic infection, control pain symptoms, and provide adequate access and stability for the restoration of the invasive cervical resorption (ICR) defect:

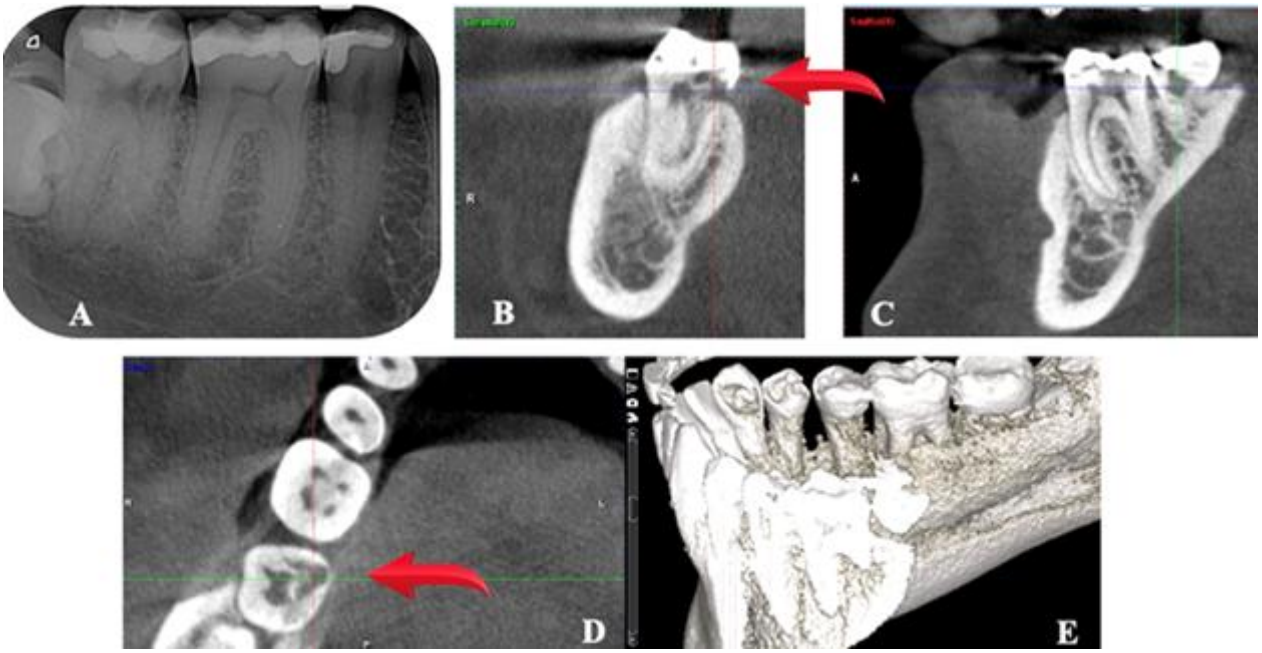

Figure 2A-E Periapical radiograph and CBCT images illustrating the diagnostic features of the invasive cervical resorption in tooth #47: **A/** Periapical radiograph showing a radiolucent area at the cervical region; **B–D/** CBCT sagittal, coronal, and axial sections indicating the mesio-lingual resorptive defect (red arrows); **E/** Three-dimensional reconstruction confirming the location and extent of the lesion relative to the alveolar bone and root surface.

1. Endodontic phase

Endodontic treatment was initiated due to ongoing provoked and spontaneous pain associated with tooth #47, with a history of approximately 2 months following composite restoration replacement. The symptom pattern was characterized by decreasing pain-free intervals and increasing episodes of discomfort. Electric pulp testing (EPT) values of 69, 75, and 77 confirmed a vital but inflamed pulp. The goal of this phase was to achieve thorough debridement and disinfection of the canal system, creating conditions suitable for three-dimensional obturation.

2. Primary restorative phase

The cervical external resorptive lesion was accessed and partially sealed through the endodontic cavity, as far as clinically feasible. The mesio-lingual defect was temporarily restored using a two-step total-etch adhesive technique to maintain hermetic sealing during and after endodontic therapy, and throughout the planned orthodontic extrusion period, approximately 4 months, followed by a retention period of another 3 months.

3. Orthodontic phase

A controlled orthodontic extrusion using fixed buccal tubes (MBT 022) was planned to coronally reposition the tooth, enhancing visibility and access to the resorptive defect. The procedure was designed to preserve the biological width and periodontal attachment integrity, creating optimal conditions for definitive restoration.

4. Definitive restoration

Following successful orthodontic extrusion, the resorptive area became fully accessible and could be isolated under a rubber dam. This allowed for precise sealing of the exposed dentine and enamel margins under moisture-controlled conditions. The tooth was definitively restored with an adhesive technique using a biocompatible material to ensure complete hermetic sealing. As the final stage, a full-coverage zirconia crown was fabricated to reinforce the tooth structure, provide long-term protection against fracture, and restore function and aesthetics.

4. Clinical Procedures

Following comprehensive clinical and radiographic evaluation, the interdisciplinary treatment plan was implemented in sequential phases.

After administration of local anaesthesia, tooth #47 was isolated with a rubber dam. Access cavity preparation was performed, and canal patency was confirmed with stainless steel hand files. The working length was determined using an electronic apex locator and verified radiographically. Canal instrumentation was carried out using a rotary nickel–titanium system under copious irrigation with 2.5% sodium hypochlorite, followed by 17% EDTA to remove the smear layer. Ultrasonic activation of the irrigant enhanced cleaning efficiency. The canals were then dried and obturated with gutta-percha and an epoxy resin-based sealer using the warm vertical compaction technique.

The cervical resorptive lesion was then approached through the endodontic cavity under magnification. Resorptive tissue was carefully removed, and the defect margins were cleaned and conditioned. The resorptive area was treated with 90% trichloracetic acid [6]. A composite restoration of the mesio-lingual defect was placed using a two-step total-etch adhesive protocol and nanohybrid composite resin to ensure tight sealing during the orthodontic phase (Figure 3,4).

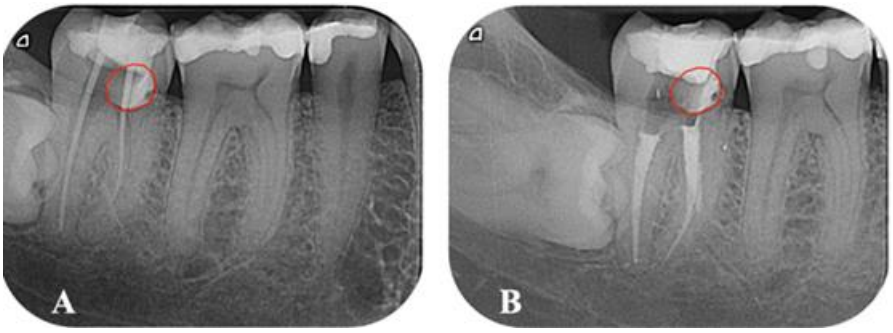

Figure 3 Periapical radiographs illustrating the controlled orthodontic extrusion of tooth #47. The left image represents the initial position, while the right image shows the tooth after extrusion. A minor apical positional change is visible at the beginning, progressing to an estimated difference of approximately 2 mm in the final stage. This apparent displacement should be interpreted considering potential image deformation due to the absence of a fixed radiographic guide for reproducible imaging. The superimposition of the two-dimensional radiographic images demonstrates the sealing of the cervical resorptive defect achieved through the endodontic cavity.

Controlled orthodontic extrusion was subsequently performed using buccal tubes, NiTi and TMA archwires over approximately 4 months and retention period of another 3 months (Figure 5). The movement was gradual and monitored periodically to maintain periodontal health and progressively reposition the tooth coronally, thereby improving access and visibility of the defect.

Radiographic assessment was performed after completion of the orthodontic extrusion phase to evaluate the final position of tooth #47 and the effect of the controlled movement on the surrounding periodontal structures.

Baseline and post-extrusion periapical radiographs were obtained under comparable angulation to minimise projection differences.

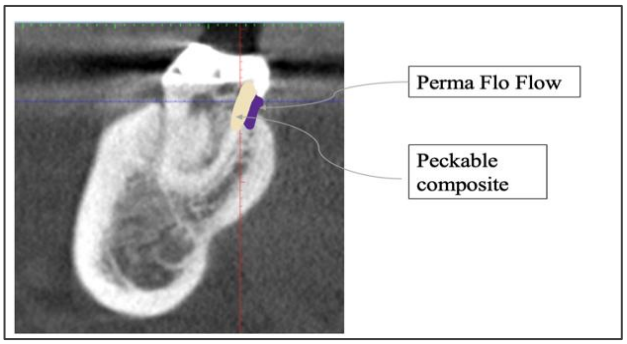

Figure 4 The preoperative CBCT image was used to present the lingual sealing of the cervical resorptive defect in tooth #47. The restoration was performed through the endodontic access cavity after successful haemostasis. The outer part of the resorptive defect was sealed with PermaFlo Flow composite - graphically represented in purple, followed by the application of a packable composite, like an inner layer (light yellow), to reinforce the coronal portion. The completed restoration provided a hermetic seal, allowing the endodontic treatment to be finalised under optimal conditions.

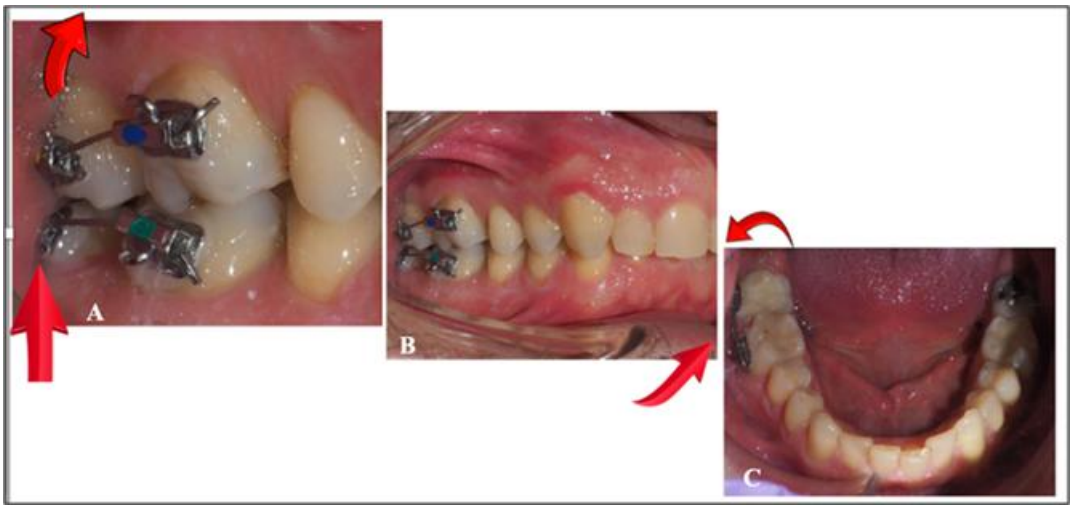

Figure 5 Intraoral photographs illustrating the orthodontic extrusion phase of tooth #47: **A/** Buccal view showing the bonded attachments and elastic traction applied to achieve controlled extrusion (red arrows); **B/** Lateral view demonstrating the

gradual coronal repositioning of the tooth in relation to the adjacent dentition; **C/** Occlusal view confirming symmetrical alignment and periodontal adaptation during the extrusion process. The orthodontic movement provided improved visibility and access to the cervical resorptive defect for subsequent restorative management.

Comparison of the two-dimensional images demonstrates the change in tooth position following orthodontic extrusion. Initially, only a minimal apical discrepancy was detectable, whereas the final radiograph shows a coronal repositioning of around 2 mm. This allows resorption lesions to remain at the level of the margo gingivalis or to be 0.5-0.8 mm below (Figure 6)

This degree of movement was sufficient to expose the cervical resorptive defect, thereby improving visibility, isolation, and access for subsequent restorative and endodontic procedures. The apparent apical displacement observed between the two radiographs should be interpreted with caution, as slight image deformation may occur in the absence of a fixed radiographic positioning guide. Nonetheless, the post-extrusion radiograph confirmed that the orthodontic treatment achieved the desired repositioning, creating optimal conditions for the definitive sealing and restoration of the resorptive lesion (Figure 7A, B). Once adequate exposure and isolation were achieved, the definitive restorative procedure was completed. The defect was prepared, the PermaFlo composite was removed because of the compromised adhesion, etched and rinsed, and followed by adhesive obturation using EmpresDirect (Ivoclar, Liechtenstein) to optimize adaptation and structural reinforcement.

Finally, a full-coverage zirconia crown was fabricated and cemented with a resin-based luting agent, providing long-term protection against fracture and restoring functional and aesthetic integrity. Postoperative radiographs confirmed satisfactory obturation and restoration. Follow-up clinical and radiographic assessments were scheduled at 3, 6, and 12 months to evaluate periapical healing and the stability of the restoration
(Figure 7B).

5. Discussion

The management of invasive cervical resorption (ICR) within a combined orthodontic–endodontic framework presents distinct challenges and opportunities for tooth preservation. Modern literature emphasizes that successful outcomes depend not only on the eradication of the resorptive process and the microbial challenge, but also on the restoration of structural integrity in a biologically favourable context [16].

The lesion's proximity to the cervical region, its anatomically complex trajectory and the potential involvement of the pulp or root canal system necessitates a collaborative, interdisciplinary strategy.

Figure 6 Intraoral view from the lingual aspect at the completion of orthodontic extrusion, showing the resorptive defect at tooth #47. The cervical margin of the lesion is now positioned coronally and clearly visible above the gingival margin, providing optimal accessibility for isolation and subsequent restorative sealing. The relocated defect level demonstrates successful extrusion and favourable periodontal adaptation.

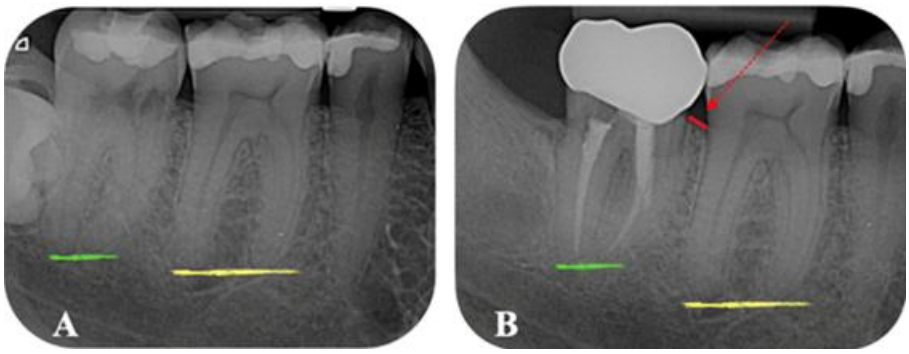

Figure 7 Periapical radiographs illustrating the controlled orthodontic extrusion of tooth #47: **A/** The radiography represents the initial position, while **B/** Post-extrusion radiograph showing an estimated coronal displacement. A minor apical positional change is visible at the initial stage, progressing to an estimated difference of approximately 2 mm in the final stage. This apparent displacement should be interpreted considering potential image deformation due to the absence of a fixed

radiographic guide for reproducible imaging. The red line shows the level and direction of the bone septum and the change after orthodontic extrusion with new bone formation (red arrow).

From an endodontic standpoint, the primary objective remains the removal or arrest of the resorptive tissue and provision of a three-dimensional seal against microbial ingress [17,18]. The literature underscores the importance of advanced imaging—especially cone-beam computed tomography (CBCT)—in quantifying the extent and direction of the defect, which, in turn, guides the surgical, internal, or combined treatment path [19]. In ICR, the risk of reinfection or progression of resorption is elevated if access is inadequate, or the sealing modality is compromised. More recent reviews advocate the use of hydraulic calcium silicate-based materials (e.g., bioceramics) for their sealing, bioactivity, and capacity to promote adjacent periodontal regeneration [20].

Controlled extrusion or repositioning of the tooth can elevate the cervical defect into a more accessible position, ensuring adequate isolation with a rubber dam and proper restorative margin placement while preserving the biological width [21]. While orthodontic movement has historically been cited as a predisposing factor in ICR aetiology, it is also valuable as a therapeutic adjunct when applied with controlled forces and appropriate planning [22]. In cases where orthodontic extrusion is contraindicated—such as in patients with short root morphology, unfavourable crown-to-root ratios, or compromised periodontal support—a surgical approach may be indicated. Surgical exposure of the defect, often performed via minimally invasive flap reflection, provides direct access for debridement and sealing under visual control, with favourable long-term outcomes reported when proper case selection is observed [23]. This method is particularly advantageous when the lesion extends subcrustal or when orthodontic repositioning cannot achieve adequate exposure without jeopardizing periodontal stability. Conversely, contraindications for surgical management include deep osseous defects, limited access to the lesion due to anatomical restrictions, or a high risk of attachment loss.

Coordinating orthodontic and restorative procedures is critical for treatment success: premature movement may compromise the integrity of temporary restorations or risk exacerbating resorption, whereas delayed movement may limit access.

The restorative component cannot be understated. Even after successful endodontic seal and orthodontic exposure, the remaining tooth structure is often compromised. The fabrication of a full-coverage crown—such as a zirconia restoration—provides structural reinforcement and protects against fracture, particularly when significant tooth substance has been lost [23,25]. A well-executed adhesive restoration of the cervical defect establishes the hermetic environment needed for long-term success. Clinical outcome studies demonstrate that the size, location and accessibility of the lesion are critical prognostic factors [7].

Despite these advances, the evidence base remains limited. A systematic review concluded that there is a lack of high-quality prospective data on outcome-modifying factors for external cervical resorption, and no standardized protocol has been universally endorsed [26]. Similarly, prognostic investigations into surgical versus non-surgical approaches highlight the need for long-term cohort studies to compare techniques, materials and follow-up intervals [25]. The structural and periodontal context—such as remaining dentine thickness, root surface integrity and supporting bone - must be integrated into the treatment planning process.

In our clinical scenario, the sequential integration of endodontic treatment (to manage symptoms and infection), orthodontic extrusion (to facilitate access and isolation), and final adhesive/restorative and prosthetic rehabilitation offers a model of interdisciplinary management. The key success factors include meticulous diagnosis (CBCT), preservation of periodontal health during orthodontic movement, and the use of biocompatible materials alongside comprehensive isolation and full-coverage reinforcement. Future research should address long-term survival rates of teeth treated with this combined approach, comparative effectiveness of restorative materials, and the optimal timing of orthodontic movements relative to endodontic–restorative phases.

In conclusion, while invasive cervical resorption remains a complex challenge, the amalgamation of contemporary endodontic, orthodontic and restorative modalities offers a pathway toward predictable tooth preservation. The clinician must adopt a holistic view – one that harmonises microbial control, structural reinforcement and physiological tooth movement – if enduring outcomes are to be achieved.

6. Conclusion

The management of teeth affected by invasive cervical resorption (ICR) remains one of the most complex and demanding challenges in contemporary dental practice. The unpredictable nature of the resorptive process, its anatomical localisation, and the potential involvement of multiple tissues necessitate a precise diagnostic approach and a well-coordinated interdisciplinary treatment plan. Effective management cannot be achieved through isolated endodontic or restorative intervention alone. Instead, successful outcomes depend on integrating endodontic disinfection and sealing, orthodontic repositioning to improve accessibility and isolation, and restorative or prosthetic reinforcement to ensure long-term structural stability.

In the present case, this comprehensive approach enabled the preservation of the natural mandibular second molar within the functional dentition—an outcome that would have been impossible without the synchronized efforts of the endodontic, orthodontic, and restorative disciplines. Continuous monitoring and radiographic follow-up are particularly important in such cases, as they allow early detection of potential recurrence and evaluation of tissue healing. Through diligent interdisciplinary collaboration and systematic follow-up, long-term retention and function of teeth affected by ICR can be predictably maintained.

References

[1] Patel S, Mavridou AM, Lambrechts P, Saberi N. External cervical resorption-part 1: histopathology, distribution and presentation. Int Endod J. 2018;51(11):1205-1223.
[2] Chen Y, Huang Y, Deng X. External cervical resorption — a review of pathogenesis and potential predisposing factors. Int J Oral Sci. 2021;13:19.
[3] Mavridou A, Rubbers E, Schryvers A, Maes A, Linssen M, Barendregt DS et al. A clinical approach strategy for the diagnosis, treatment and evaluation of external cervical resorption. Int Endod J. 2022;55(4):347-373.
[4] Talpos-Niculescu RM, Gheorghiu S-V, Zamfir-Crasniciuc I, Dican M. External cervical resorption: radiological diagnosis and literature review. Exp Ther Med. 2021;22(6):1065.
[5] Lee YB, Alapati S, Riolo V, et al. Interdisciplinary approach for management of external cervical resorption. Clin Case Rep. 2021;9(11):e4908.
[6] Asgary S. Invasive cervical root resorption: A comprehensive review. PMCID PMC10787181. 2024.
[7] Jeng PY, Lin LD, Chang SH, et al. Invasive Cervical Resorption-Distribution, Potential Predisposing Factors, and Clinical Characteristics. J Endod. 2020;46(4):475-482.
[8] Karunakar P, Soloman RV, Anusha B, Nagarjun M. Endodontic management of invasive cervical resorption: Report of two cases. J Conserv Dent. 2018;21(5):578-581.1):2-12.
[9] Salama H, Salama M. The role of orthodontic extrusive remodeling in the enhancement of soft and hard tissue profiles prior to implant placement: a systematic approach to the management of extraction site defects. Int J Periodontics Restorative Dent. 1993 Aug;13(4):312-33.
[10] Cordaro M, Staderini E, Torsello F, Grande NM, Turchi M, Cordaro M. Orthodontic Extrusion vs. Surgical Extrusion to Rehabilitate Severely Damaged Teeth: A Literature Review. Int J Environ Res Public Health. 2021 Sep 10;18(18):9530.
[11] Bardini G, Orrù C, Ideo F, Nagendrababu V, Dummer P, Cotti E. Clinical management of external cervical resorption: a systematic review. Aust Endod J. 2023;00:1-19.
[12] Khosravifard, N., Vadiati Saberi, B., Khosravifard, A. et al. Introducing a new auto edge detection technique capable of revealing cervical root resorption in CBCT scans with pronounced metallic artifacts. Sci Rep **14**, 4245 (2024).
[13] Patel S, Mavridou AM, Lambrechts P, Saberi N. External cervical resorption—part 1: histopathology, distribution and presentation. Int Endod J. 2021;51(11):1205–1223.
[14] Rotondi O, Waldon P, Kim SG. The disease process, diagnosis and treatment of invasive cervical resorption: a review. Dent J. 2020;8(3):64.
[15] Chen Y, Huang Y, Deng X. External cervical resorption – a review of pathogenesis and potential predisposing factors. Int J Oral Sci. 2021;13:19.
[16] Bardini G, Orrù C, Ideo F, Nagendrababu V, Dummer P, Cotti E. Clinical management of external cervical resorption: A systematic review. Aust Endod J. 2023;49(3):769-787.
[17] Surgical repair of external cervical resorption – Prognosis and potential prognostic factors. Jeng PY. Dent Traumatol. 2024.
[18] Bardini G et al. Clinical management of external cervical resorption: a systematic review. Aust Endod J. 2023;00:1–19. 16. Jeng PY. Surgical repair of external cervical resorption – prognostic study. Dent Traumatol. 2024.
[19] Patel S, et al. External cervical resorption: part 2 – management. International Endodontic JournalVolume 51, Issue 11 pp. 1224-1238.
[20] Abbott PV, Lin S. Tooth resorption-Part 2: A clinical classification. Dent Traumatol. 2022 Aug;38(4):267-285.
[21] Lin S, Moreinos D, Kaufman AY, Abbott PV. Tooth Resorption - Part 1: The evolvement, rationales and controversies of tooth resorption. Dent Traumatol. 2022 Aug;38(4):253-266.
[22] Jeng P, et al. Surgical repair of external cervical resorption - Prognosis and prognostic factors. J Dent Scien 2024; 19(1): 377-386.
[23] Consolaro A. External cervical resorption: diagnostic and treatment tips. Dental Press J Orthod. 2016 Sep-Oct;21(5):19–25.
[24] Ravikumar S, Khan AA, Davis MC, Paniagua B. Automated external cervical resorption segmentation in cone-beam CT using local texture features. arXiv. Published January 9, 2025. Accessed September 4, 2025.
[25] Asgary S, Dianat O. Invasive Cervical Root Resorption: A Comprehensive Review on Pathogenesis, Diagnosis, and Treatment. Iran Endod J. 2024;19(1):2-12.
[26] Karunakar P, Soloman RV, Anusha B, Nagarjun M. Endodontic management of invasive cervical resorption: Report of two cases. J Conserv Dent. 2018;21(5):578-581.1):2-12