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Letter to the Editor

External Cervical Resorption Revisited: From Biological Complexity to CBCT- Guided Conservative Treatment

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Dear Editor,

External cervical resorption (ECR) remains a complex clinical entity because it is not merely a structural defect of the tooth root, but a biologically active and often silent resorptive process. In its early stages, ECR may be asymptomatic and detected incidentally during radiographic examination, while advanced lesions may compromise the pulp, periodontium, esthetics, and long-term tooth retention. [1–3]

The biological behavior of ECR deserves particular attention. Histopathological evidence indicates that ECR develops through penetration of resorptive tissue into cervical dentin, formation of granulation tissue, activity of multinucleated clastic cells, and extension of resorption channels within the root. At the same time, ECR may also show reparative features, including apposition or remodeling of bone-like tissue. [1,2] Therefore, ECR should be interpreted as a dynamic destructive-reparative process rather than as a simple cervical defect.

From a clinical standpoint, this biological complexity reinforces the importance of three-dimensional diagnosis. Two-dimensional radiographs may underestimate the true extension, circumferential spread, and proximity of the lesion to the pulp. CBCT-based assessment allows a more precise evaluation of lesion height, circumferential involvement, pulpal proximity, and accessibility, all of which are essential for selecting an appropriate management strategy. [2,4,5] In the presented clinical sequence, the CBCT image demonstrates the cervical/root resorptive defect and its spatial relationship with adjacent hard tissues, supporting the need for three-dimensional evaluation before intervention (Figure 1).

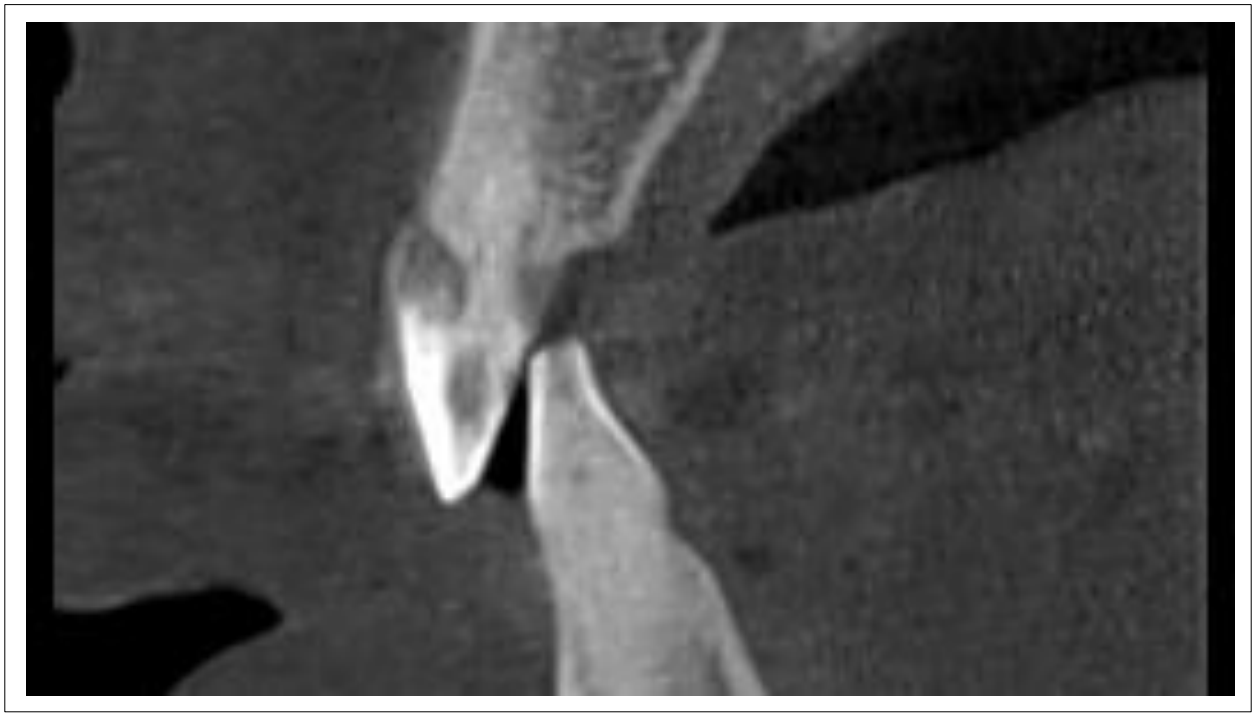

Figure 1. CBCT image of the affected maxillary left central incisor [FDI tooth number: 21]**,** showing a cervical/root resorptive defect. The image demonstrates the three-dimensional extent of the lesion, its cervical localization, and its relationship with adjacent hard tissues and the root canal space.

The present case involved a 22-year-old male patient who presented with an esthetic concern involving the maxillary left central incisor (FDI tooth number: 21). The patient reported no spontaneous pain, swelling, periodic discomfort, or other symptoms. The preoperative clinical photograph illustrates the relevance of early recognition, particularly in the anterior esthetic zone, where cervical involvement may affect both restorative and periodontal prognosis (Figure 2). A pinkish cervical discoloration can be observed, which may be explained by the ingress of vascular periodontal/granulation tissue into the resorptive defect at the cervical region. Although the "pink spot" is classically associated with internal root resorption, a similar clinical sign may also be present in external cervical resorption when vascular resorptive tissue becomes visible through the remaining dental hard tissues. Therefore, such a clinical finding should not be interpreted in isolation; careful differential diagnosis between internal root resorption, external cervical resorption, and cervical caries is required, preferably supported by CBCT evaluation.

Clinically, pulp vitality testing showed a positive response, while periodontal probing revealed physiological probing depths within normal limits, with no isolated deep periodontal pocketing, suppuration, or pathological tooth mobility. These findings supported a conservative management approach without immediate endodontic intervention. In such cases, treatment planning should not depend only on the radiographic presence of a lesion, but also on accessibility, pulpal status, periodontal condition, restorability, esthetic demand, and patient-specific risk factors.

Importantly, current evidence does not support a single universal protocol for all ECR lesions. Bardini et al. reported that available evidence is mainly based on case reports and case series, with no randomized clinical trials. Although external surgical access was frequently reported and

mechanical removal of resorptive tissue was commonly used, no treatment approach demonstrated clear superiority in relation to Heithersay's classification. [2] This supports an individualized, lesion-specific approach rather than a rigid treatment algorithm.

Figure 2. Preoperative clinical view showing localized cervical involvement of the affected maxillary anterior tooth. A pinkish cervical discoloration (arrow) is visible, suggesting the presence of vascular periodontal/granulation tissue within the resorptive defect.

The operative images demonstrate this conservative philosophy. After appropriate isolation, the resorptive defect can be accessed, debrided, and restored adhesively when the lesion is accessible and pulpal involvement is absent or avoidable (Figure 3). In the presented case, the operative field was isolated with a rubber dam, and the resorptive cavity was carefully debrided to remove soft resorptive/granulation tissue while preserving sound dental structure. Hemostasis and moisture control were achieved before bonding. The cavity was cleaned and gently dried without dentin desiccation. The adhesive procedure was performed according to the manufacturer's instructions for the selected bonding system. Where enamel margins were present, phosphoric acid etching was performed to enhance marginal bonding. A dentin bonding agent was then applied, air-thinned, and light-cured. The defect was restored using an incremental resin composite technique, with careful adaptation of the composite material to the cervical defect, avoidance of over-contouring, and adequate light curing of each increment. The restoration was then finished and polished to obtain a smooth, plaque-resistant cervical contour. The post-restorative view shows re-establishment of tooth morphology and sealing of the cervical defect, which are essential for limiting bacterial contamination, improving cleanability, reducing plaque retention, and supporting periodontal stability (Figure 4).

Recent clinical evidence also supports conservative adhesive management in carefully selected cases. Zaccheo et al. reported an ECR lesion diagnosed by CBCT as supracrestal, with limited circumferential spread and no pulpal involvement. The lesion was managed with flap access,

granulomatous tissue removal, cavity refinement, and restoration with a polished resin composite. At three years, the tooth remained vital, and CBCT showed unexpected coronal bone remodeling with new bone formation over the treated lesion. [6]

Figure 3. Operative view showing rubber dam isolation and adhesive restorative management of the resorptive defect. Isolation was used to control moisture, improve visibility, permit debridement of the resorptive tissue, and facilitate adhesive restoration of the cervical defect.

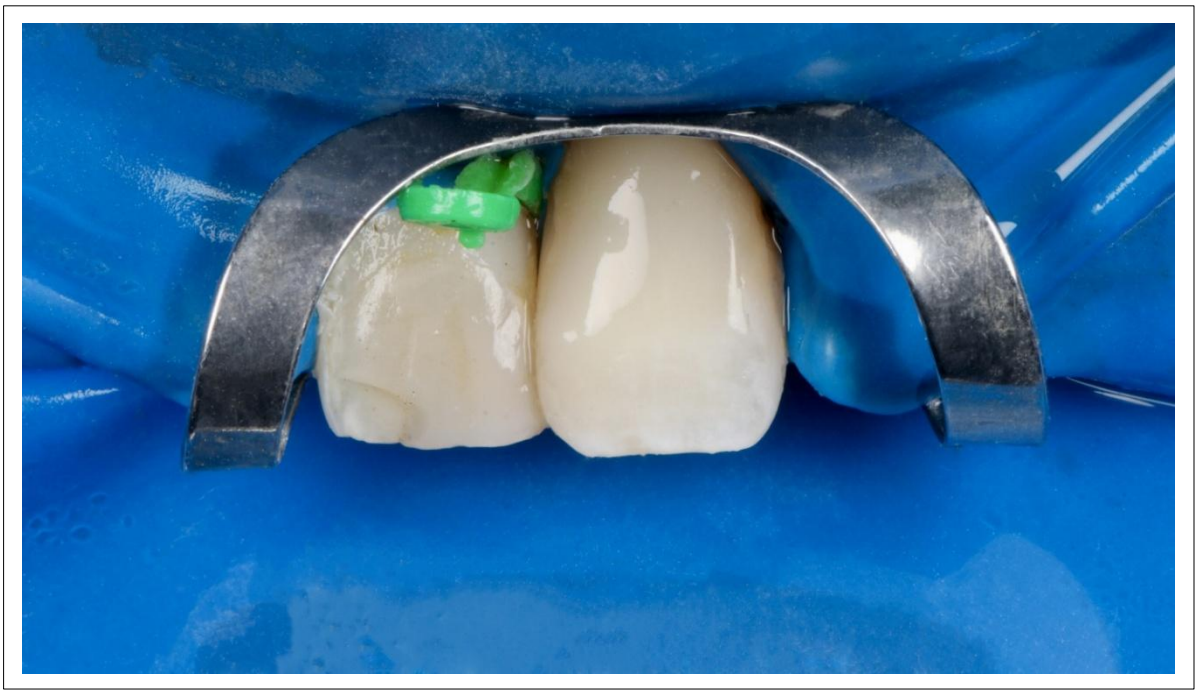

Figure 4. Post-restorative clinical view showing re-establishment of cervical tooth morphology and sealing of the resorptive defect. The smooth restorative contour is intended to improve cleanability, reduce plaque retention, and support periodontal stability.

The long-term prognosis of conservatively managed ECR depends on several interrelated

factors, including early diagnosis, three-dimensional lesion extension, circumferential spread, proximity to the pulp, accessibility for complete debridement, quality of adhesive sealing, periodontal status, oral hygiene, and regular follow-up. Lesions that are supracrestal or easily accessible, and not associated with pulpal involvement generally have a more favorable prognosis than extensive subcrestal lesions with pulpal or periodontal complications. Conversely, deep subgingival extension, incomplete removal of resorptive tissue, poor restorative sealing, plaque-retentive restorative margins, pulpal involvement, and inadequate follow-up may compromise treatment success.

After conservative management, follow-up should include clinical examination, periodontal probing, mobility assessment, pulp vitality testing, and radiographic evaluation, as treatment outcomes in ECR are generally assessed by the absence of symptoms, periodontal stability, and the absence of radiographic progression. [2,5,6] A practical follow-up protocol may include review at 1–3 months to assess soft-tissue healing and restoration integrity, 6 months for clinical and radiographic reassessment, 12 months for evaluation of lesion stability, and then annual follow-up for at least 3–5 years. [2,6] CBCT should not be repeated routinely, but may be indicated when symptoms, periodontal deterioration, radiographic suspicion of progression, or uncertain healing are observed, in accordance with the principle that three-dimensional imaging should be reserved for cases in which it may influence diagnosis or management. [4,5]

Therefore, teeth affected by ECR should not automatically be considered hopeless. When the lesion is diagnosed early, accurately classified using CBCT, accessible for debridement, and restorable without compromising periodontal health, conservative management may represent a biologically respectful and tooth-preserving option. Nevertheless, long-term follow-up remains mandatory because recurrence, pulpal complications, or periodontal breakdown may still occur.

In conclusion, ECR management should move toward a CBCT-guided, biologically informed, and individualized model. Future prospective studies are needed to clarify which materials, access strategies, and lesion classifications offer the most predictable outcomes. Until then, clinicians should integrate radiographic classification, biological behavior, and case-specific clinical parameters into treatment planning.

Abbreviation	**Full Form**
CBCT	Cone-Beam Computed Tomography
ECR	External Cervical Resorption
FDI	Federation Dentaire Internationale

Declarations:

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