

Internal Root Resorption: A Review

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Abstract

Introduction: Internal root resorption is the progressive destruction of intraradicular dentin and dentinal tubules along the middle and apical thirds of the canal walls as a result of clastic activities. **Methods:** The prevalence, etiology, pathogenesis, histologic manifestations, differential diagnosis with cone beam computed tomography, and treatment perspectives involved in internal root resorption are reviewed. **Results:** The majority of the documentation that exists in the literature is in the form of case reports, and there are only a limited number of studies that attempted to examine the histologic manifestations and biologic aspects of the disease. This might be due, in part, to the relatively rare occurrence of this type of resorption and the lack of an *in vivo* model, apart from the previous attempt on the use of diathermy, to predictably reproduce the condition for study. From a histologic perspective, internal root resorption is manifested in one form that is purely destructive, internal (root canal) inflammatory resorption, and another that is accompanied by repair, internal (root canal) replacement resorption that is featured by the deposition of metaplastic bone/cementum-like tissues adjacent to the sites of resorption. **Conclusions:** From a differential diagnosis perspective, the advent of cone beam computed tomography has considerably enhanced the clinician's capability of diagnosing internal root resorption. Nevertheless, root canal treatment remains the treatment of choice for this pathologic condition to date. (*J Endod* 2010;36:1107–1121)

Key Words

Bone metaplasia, cone beam computed tomography, internal root resorption, pulp histology, pulp inflammation

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Root resorption is the loss of dental hard tissues as a result of clastic activities (1). It might occur as a physiologic or pathologic phenomenon. Root resorption in the primary dentition is a normal physiologic process except when the resorption occurs prematurely (2, 3). The initiating factors involved in physiologic root resorption in the primary dentition are not completely understood, although the process appears to be regulated by cytokines and transcription factors that are similar to those involved in bone remodeling (4, 5). Unlike bone that undergoes continuous physiologic remodeling throughout life, root resorption of permanent teeth does not occur naturally and is invariably inflammatory in nature. Thus, root resorption in the permanent dentition is a pathologic event; if untreated, this might result in the premature loss of the affected teeth.

Root resorption might be broadly classified into external or internal resorption by the location of the resorption in relation to the root surface (6, 7). Internal root resorption has been reported as early as 1830 (8). Compared with external root resorption, internal root resorption is a relatively rare occurrence, and its etiology and pathogenesis have not been completely elucidated (9). Nevertheless, internal root resorption poses diagnostic concerns to the clinician because it is often confused with external cervical resorption (ECR) (10–12). Incorrect diagnosis might result in inappropriate treatment in certain cases (13).

The aim of this work is to review the etiology and pathogenesis of internal root resorption as well as the problems encountered in the diagnosis and treatment planning of this condition. In addition, the epidemiology, classification, and histologic features of internal root resorption will be discussed.

Prevalence

Internal root resorption has been described as intraradicular or apical according to the location in which the condition is observed (9). Intraradicular internal resorption is an inflammatory condition that results in progressive destruction of intraradicular dentin and dentinal tubules along the middle and apical thirds of the canal walls. The resorptive spaces might be filled by granulation tissue only or in combination with bone-like or cementum-like mineralized tissues (14). The condition is more frequently observed in male than female subjects (15, 16). Although intraradicular internal root resorption is a relatively rare clinical entity even after traumatic injury (17, 18), a higher prevalence of the condition has been associated with teeth that had undergone specific treatment procedures such as autotransplantation (19). Cabrini et al (20) amputated the coronal pulps of 28 teeth and dressed the radicular pulp stumps with calcium hydroxide mixed with distilled water. Eight of the 28 teeth extracted between 49 and 320 days after the procedure demonstrated histologic evidence of internal resorption. Çalışkan and Türkün (16) examined the prognosis of endodontic treatment on 25 teeth with nonperforating and perforating internal resorption. The authors reported that the most commonly affected teeth were maxillary incisors. The small sample sizes in these studies precluded definitive conclusions to be drawn on the prevalence of internal root resorption. Moreover, diagnosis of internal resorption in most of the earlier studies was based solely on 2-dimensional radiographic evidence, without complementary 3-dimensional radiographic and/or histologic support. Further epidemiologic studies are required to identify whether there are racial predilections in the manifestation of intraradicular internal resorption.

Compared with intraradicular internal resorption, apical internal resorption is a fairly common occurrence in teeth with periapical lesions (21). The authors examined the extent of internal resorption in 75 roots (69 roots with radiolucent periapical