

Invasive Cervical Resorption: A Review

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Abstract

Invasive cervical resorption (ICR) is a relatively unusual form of external resorption and usually begins at the cervical region of the tooth. The exact etiology and pathogenesis of ICR is still poorly understood, but this aggressive form of external resorption results in destructive loss of the tooth structure, which often resembles internal resorption “pink tooth”[1]. This article predominantly reviews the predisposing factors, classifications and management of invasive cervical resorption.

Keywords: Root resorption, Invasive cervical resorption,

Introduction

Tooth resorption is a common occurrence after injuries or irritation of periodontal ligament or pulp. The process involves an elaborate interaction of inflammatory cells, resorbing cells, and hard-tissues structures. Irritation and Injuries of dentin, bone or cementum lead to chemical changes within these tissues, resulting in the formation of

multinucleated giant cells, which cause resorption of hard tissues.

There are two types of tooth resorption: internal and external resorption. Based on clinical and histologic features, external tooth resorption has been classified into four types external surface resorption, external inflammatory root resorption, replacement resorption, and ankylosis. Invasive cervical resorption (ICR) is a type of external inflammatory root resorption [2].

Invasive cervical resorption is a clinical term used to describe a relatively uncommon, insidious and often aggressive form of external tooth resorption, which may occur in any tooth in the permanent dentition. Characterized by its cervical location and invasive nature, this resorptive process leads to progressive and usually destructive loss of tooth structure [3, 2,].

It is defined as “a localized resorptive process that commences on the surface of the root below the epithelial attachment and the coronal aspect of the supporting

alveolar process, namely the zone of the connective tissue attachment [4].”

ICR is often misdiagnosed as internal resorption because of its similarity to clinical presentation of internal resorption as described by Gaskill in 1894 and by Mummery in 1920, which included teeth showing pink spots [3,4,5].

Potential predisposing factors: Several potential predisposing factors identified by Harrington and Natkin in 1979 are as follows[3].

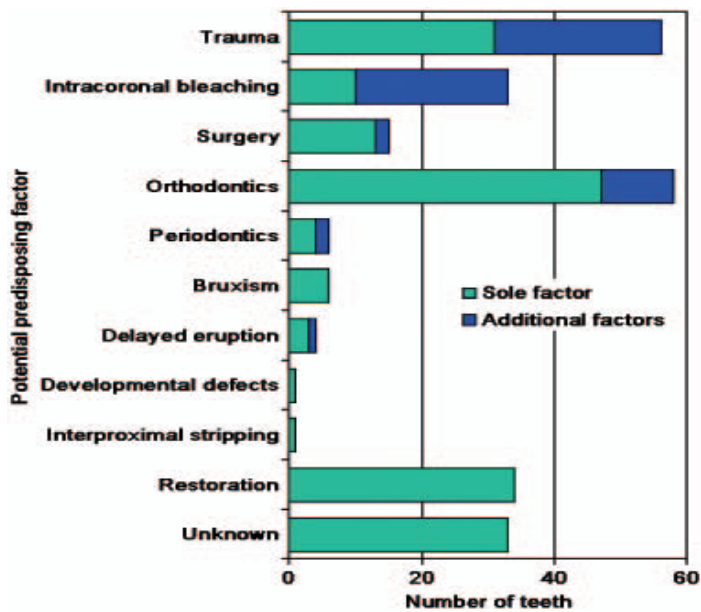


Fig.1: Invasive cervical resorption: Distribution of potential predisposing factors for patient.

Clinical classification [4] (fig 2)

Class 1 –Denotes a small invasive resorptive lesion near the cervical area with shallow penetration into dentine.

Class 2 – Denotes a well-defined invasive resorptive lesion that has penetrated close to the coronal pulp chamber but shows little or no extension into the radicular dentine.

Class 3 – Denotes a deeper invasion of dentine by resorbing tissue, not only involving the coronal dentine but also extending into the coronal third of the root.

Class 4 – Denotes a large invasive resorptive process that has extended beyond the coronal third of the root.

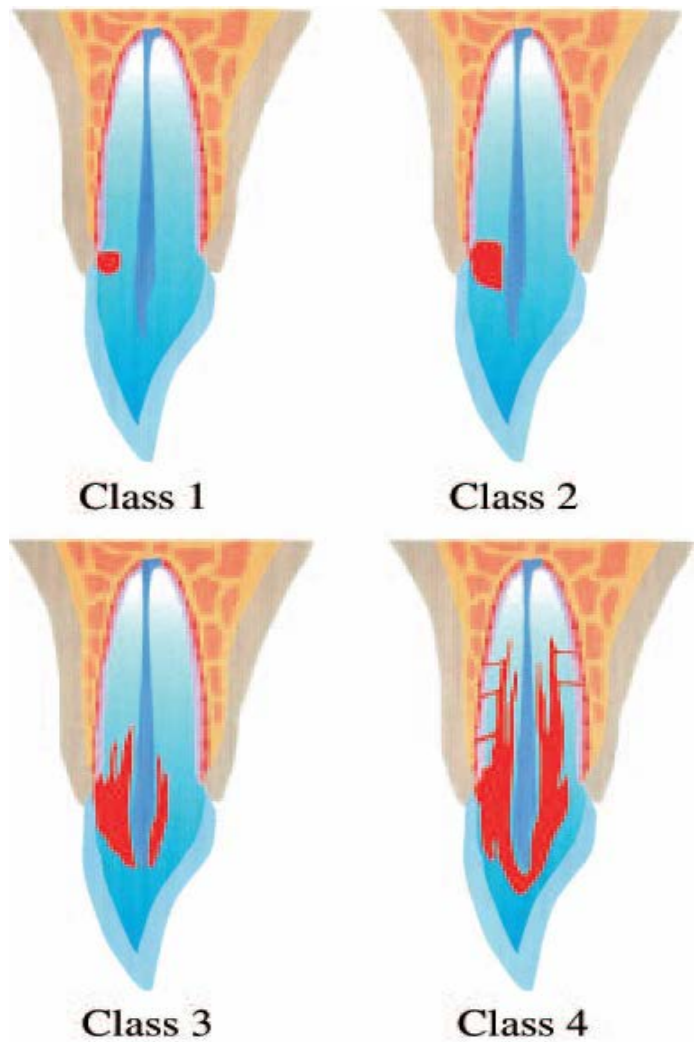


Fig. 2: Clinical classification of invasive cervical resorption.

Clinical and radiological features

ICR primarily presents itself as a painless condition, while a pink discoloration of the crown indicates the resorptive process, some teeth give no visual signs and diagnosis is usually the result of a radiologic examination. Particularly when there has been a history of orthodontic treatment [6], multiple resorptions can occur due to continuous pressure which stimulates the resorbing cells [7] and a full mouth radiographic examination should be done.

Invasive cervical resorption lesions can spread horizontally, axially & circumferentially into the dentin [8].

Hence size and location of ICR can be determined more accurately by cone beam computed tomography (CBCT) [9]. A study by Patel et al. compared the effectiveness of CBCT with periapical radiographs, which revealed that periapical radiographs had limited performance in assessment of size, circumferential spread and location of lesion [10].

Clinical features differ depending on the stage of the lesion as described below: [3,11].

Class 1

Some early lesions which are in this category may show a slight irregularity in the gingival contour associated with a surface defect containing soft tissue which bleeds on probing. A radiograph will usually show a small coronal radiolucency corresponding to the lesion.

Class 2

Invasive resorptive lesions of this class may present with a pink discoloration of the tooth crown, while the radiographic image usually shows a surprisingly extensive irregular radiolucency extending from the cervical area into the tooth crown and projected over the root canal outline. If the lesion is proximally located the radiographic image will show a radiopaque line bordering the pulp space.

The presence of the apparently protective predentin, dentin layer explains the asymptomatic nature of invasive cervical resorption at this stage and it could be postulated that pulpitic symptoms only develop when the resorption ultimately penetrates through this barrier and is secondarily invaded by oral microorganisms.

Class 3

In this category the invasive resorptive process has radicular extensions into, but not beyond, the coronal third of the root. Clinically, the crown of an involved tooth may show a pink discoloration, and there may be cavitation of the overlying enamel.

The radiographic appearance generally shows an irregular mottled, or 'moth-eaten' image in the main lesion area and the outline of the root canal can be seen as a radiopaque line demarcating the root canal from the adjacent irregular radiolucency, the latter being indicative of resorbing tissue.

Class 4

This category includes invasive resorptive processes that have extended beyond the coronal third of the root. While the crown displayed a pink discoloration in the cervical region, the radiograph shows, in addition to the irregular outline of the resorptive process in the tooth crown, radiolucent lines extending alongside the pulp space into the apical third of the root.

Clinical management

As the pathological manifestations of the various classes of invasive cervical resorption become more complex, differing non-surgical or surgical treatment modalities will be required. Treatment primarily depends on severity of the lesion, location, pulpal involvement, and restorability of the tooth. However, the basic aim remains the same, namely the inactivation of all active resorbing tissue and the reconstitution of the resorptive defect either by the placement of a suitable filling material or by the use of biological systems such as membranes, so that the tooth may be healthily and aesthetically retained [12].

Non-surgical treatment The nonsurgical treatment involved the topical application of a 90% aqueous solution of trichloroacetic acid (TCA) to the resorptive tissue, curettage, endodontic treatment where necessary, and restoration with glass-ionomer cement.

The rationale for the topical application of trichloroacetic acid in the treatment of these resorptive lesions was to utilize the proven action of this chemical agent in inducing coagulation necrosis of the resorptive tissue and infiltrates

small channels and recesses that otherwise remain inaccessible by mechanical instrumentation.[4,1,5].

Adjunctive orthodontic extrusion was also employed in some advanced lesions to improve the access to the defect and to establish a supragingival margin for the restoration. The tooth is extruded using light wire technique, over a period of 4-6 weeks, followed by splinting, precision, gingivoplasty and restoration [5].

Endodontic treatment is necessary only if the resorption invades the pulp space or is very close to it, i.e in case of class 2 and class 3 cases [13].

Surgical management

Surgical treatment of varying degrees of invasive cervical resorption has generally involved periodontal flap reflection, curettage, restoration of the defect is often necessary for access and complete debridement of the lesion. Periodontal reattachment cannot be expected with amalgam or composite resin, and is unlikely with glass-ionomer cement, but there is experimental evidence to suggest that this might be possible with MTA [14] or Biodentin [15] in this situation and also successful management of invasive cervical resorption with reimplantation of tooth & sealing of resorptive site with biodentine has also been reported [16]. An alternative surgical option is to apically position the flap to the base of the resorption repair [5]. However, should this prove aesthetically unacceptable, orthodontic extrusion can be utilized to improve the gingival contour [1, 17].

Membranes such as Goretek, Emdogain or bone graft materials may promote regeneration of localized periodontal and bone lesions. The successful use of platelet rich fibrin (PRF) and hydroxyapatite in periodontal defect associated with ICR has also been reported [18]

Conclusion

Invasive cervical resorption is a relatively uncommon and clinically challenging condition with an academically debatable pathogenesis [5]. The invasive and somewhat aggressive characteristics of the process, coupled with its histopathologic features, raise questions as to the nature of the lesion. Proper diagnosis, case selection, and its implementation can lead to the successful outcome and longterm retention of the tooth.

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