



ISSN Print: 2394-7489
ISSN Online: 2394-7497
IJADS 2020; 6(3): 186-188
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www.oraljournal.com
Received: 23-06-2020
Accepted: 25-07-2020

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Invasive cervical resorption: A review

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Abstract

Invasive cervical resorption is a relatively uncommon form of external root resorption exhibiting no external signs. The resorptive condition is often detected by routine radiographic examination. The clinical features vary from a small defect at the gingival margin to a pink coronal discoloration of the tooth crown resulting in ultimate cavitation of the overlying enamel which is painless unless pulpal or periodontal infection supervenes. Correct diagnosis and proper management can result in a successful outcome. The treatment should aim toward the complete suppression of all resorbing tissues and the reconstruction of resorptive defect by the placement of a suitable filling material or some biological systems.

Keywords: Invasive reorption

Introduction

Root resorption is the loss of hard dental tissue (i.e., cementum and dentin) as a result of odontoclastic action [1]. According to Lindskog, resorption may be classified as trauma-induced tooth resorption, infection-induced tooth resorption and hyperplastic invasive resorption [2].

Root resorption might be classified by its location in relation to the root surface i.e. internal or external resorption. External root resorption can be further classified into surface resorption, external inflammatory resorption, external replacement resorption, external cervical resorption and transient apical breakdown [1]. External resorption may be physiological and pathological. External resorption can be classified as surface, inflammatory and replacement ankylosis resorption [3]. Cervical external resorption also called as 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 of permanent dentition. Invasive cervical resorption is defined as 'a localized resorptive process that commences on the surface of root below the epithelial attachment and the coronal aspect of the supporting alveolar process, namely the zone of the connective tissue attachment.

Invasive cervical resorption (ICR) is a type of external inflammatory root resorption. It is a relatively distinct clinical entity, although its wide spectrum of clinical presentations has resulted in its designation by different names such as progressive intradental resorption and invasive resorption [4, 5]. 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 [3].

Aetiology and Pathogenesis

Since the Muller and Rony reported the cases, numerous causes have been documented but none of them had conclusively identified any specific etiologic agent [6]. The controversy remains among investigators about nature of the lesion. According to some this process is purely inflammatory while others think that the process is activated by sulcular microorganisms or alternatively it is benign proliferative fibro-vascular disorder or fibro-osseous disorder in which micro-organisms have pathogenic role but may become secondary invaders [7].

Several factors have been suggested to predispose to the occurrence of this lesion. These include orthodontic treatment, trauma, intracoronal bleaching, surgical procedures, periodontal therapy, bruxism, intracoronal restorations, developmental defects, delayed eruption, interproximal stripping and systemic diseases [1, 8].

Of these, orthodontic treatment, trauma, intracoronal bleaching are the major contributory factors [8]. In some cases a combination of the above may be present and yet in several cases, the etiology may be unknown. Maxillary canines, maxillary central incisors and mandibular first molars are the teeth commonly affected by ICR following orthodontic treatment. Excessive orthodontic forces at the cervical region can result in necrosis adjacent to exposed dentin of root which might stimulate differentiation of odontoclasts that resorb the exposed root dentin

Apart from these local factors, systemic conditions may also play a role in ICR. Conditions like hyperoxaluria, oxalosis [9], normocalcemic hypercalciuria and nephrolithiasis have been suggested to cause root resorption. Certain individuals might have a genetic predisposition to ICR.

Classification

Heithersay G.S. (Table 1) has proposed a clinical classification of invasive cervical resorption depending on the amount of destruction [8].

Table 1: Clinical Classification of Invasive Cervical Resorption

Class 1	a small invasive resorptive lesion near the cervical area with shallow penetration into dentin
Class 2	a well-defined invasive resorptive lesion that has penetrated close to the coronal pulp chamber but shows little or no extension into the radicular dentin
Class 3	a deeper invasion of dentin by resorbing tissue, not only involving the coronal dentin but also extending into the coronal third of the root
Class 4	a large, invasive resorptive process that has extended beyond the coronal third of the root

Diagnosis: Early diagnosis, elimination of the resorption, and restorative management are the keys to a successful outcome.

Clinical Features: In the absence of treatment, there is progressive destruction of tooth structure. Initially it is painless, but the patient may become symptomatic when pulpal or periodontal tissues are secondarily infected. Resorption of coronal dentine and enamel creates an appearance of ‘pink tooth’ in the cervical area as the vascular resorptive tissue becomes visible through thin enamel [10, 11]. The lesions may become symptomatic when the pulpal or periodontal infection supervenes secondarily on invasion of pulp by the lesion [12].

Hence, the chances of majority of lesions detected in the later stages i.e. class 3 type of lesions are more. Pulp vitality tests are within normal limits unless deep resorptive cavity due to proximity to pulp results in sensitivity to temperature. The reason for this is that the resorption starts on the root surface, but when the predentin is reached, it proceeds laterally and in an apical and coronal direction, progressively enveloping the root canal [13]. Profuse bleeding may be present spontaneously or on probing. The edges around the resorptive cavity are

sharp and thinned out.

Radiographic features: ICR is usually detected as chance radiographic finding as the tooth is usually asymptomatic. The appearance may vary from asymmetrically located radiolucency with irregular margins in cervical or proximal areas to uniformly round radiolucency centered over the root. The lesion can be misdiagnosed as an internal resorption on radiograph which can be prevented by taking radiographs of varying angulations. If the lesion is internal resorption the radiolucency will remain static; if lesion is ICR then the lesion will move according to Clarks rule or SLOB rule [11]. Multiple lesions can occur so the full mouth radiography should be done to rule out the multiple lesions.

Differential diagnosis: ICR may be mistaken for subgingival caries, which usually feels sticky on probing, in contrast with the hard feel of a resorptive defect. ICR can be confused with internal resorption because teeth with internal resorption in coronal area may present with ‘pink spot’. It can also be mistaken as external inflammatory root resorption and cervical burnout [14].

Management of resorption [2]

Invasive coronal resorption	Invasive cervical resorption
<ul style="list-style-type: none"> Carefully apply 90% trichloroacetic acid to resorptive tissues with glycerol. Curette, apply trichloroacetic acid to affected resorptive tissue from defect. If pulp involvement, pulpectomy and root canal filling after intra-canal dressing with Ledermix paste. Orthodontic extrusion if necessary. 	<ul style="list-style-type: none"> Class 1, 2 - Topical application of 90% trichloroacetic acid, curettage, and glass ionomer restoration. Class 3 - Topical application of 90% trichloroacetic acid to resorptive tissue, curettage, elective pulpectomy and canal preparation to gain access to deeper and encircling infiltrating channels. Ledermix paste intracanal dressing, followed by root filling and final glass ionomer cement restoration. Adjunctive orthodontic extrusion if necessary. Alternative therapy: periodontal flap reflection, curettage, trichloroacetic acid application to defect, endodontic therapy and restoration. Class 4 - Leave untreated and monitor or extract and implant.

Several materials have been used to restore the resorptive defect after curettage, and many materials continue to be tested for use in such conditions. Glass ionomer cement (GIC) and composite resins have been traditionally used for restoration. However dentin that has been treated with TCA is severely demineralized and therefore not suitable for bonded restorations like GIC or composite [15]. The dentin must be refreshed with a bur before bonding procedures. Resin modified glass ionomer cement (RMGIC) and composite resin have been used because they are stronger, bond to tooth structure, and are relatively stable in oral cavity. Newer bioactive materials have been successfully used to treat cases of ICR.

Conclusion

Invasive cervical resorption is an aggressive form of tooth resorption. Its etiology is poorly understood. Several predisposing factors have been identified which contribute to development of the lesion. Thus teeth with cervical resorption fall into difficult category in achieving predictable outcome. It may be challenging for even experienced practitioners. This review will present information necessary to aid practitioners in proper diagnosis and clinical management of this type of teeth.

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