
**CONSIDERATIONS REGARDING GRADE IV EXTERNAL ROOT RESORPTION OF A
TRAUMATIC ETIOLOGY**
*CONSIDERAÇÕES SOBRE REABSORÇÃO RADICULAR EXTERNA DE GRAU IV COM
ETIOLOGIA TRAUMÁTICA*

Jurema Freire Lisboa de CASTRO ¹

Natalie KELNER ²

Pâmella Sobrinho BEZERRA ³

Suely Baptista OLIVEIRA ⁴

Claudia Cazal ⁵

Endereço para correspondência:
Av. Prof. Moraes Rego 1235
Pós-graduação em Odontologia

RESUMO

A reabsorção radicular externa é considerada um problema de etiologia multifatorial podendo ser definida como uma atividade fisiológica ou patológica, decorrente principalmente da ação de clastos ativados, sendo caracterizada pela perda progressiva ou transitória de cimento ou cimento e dentina. Em alguns casos pode ser induzida através da pressão exercida pela movimentação ortodôntica dentária. Um controle radiográfico periódico, antes, durante e após o tratamento é importante para detecção da reabsorção. Este artigo tem como objetivo tecer considerações sobre a reabsorção dentária tipo 4 de etiologia traumática em um paciente com 22 anos de idade, sexo masculino, leucoderma, que ao exame radiográfico de rotina apresentou reabsorções radiculares do tipo grau 4, nos elementos anteriores superiores e inferiores, e em molares que serviram de ancoragem. A radiografia inicial mostra condições de normalidade, sendo portanto a causa das reabsorções decorrentes do tratamento ortodôntico.

UNITERMOS: reabsorção radicular, ortodontia, radiografias.

ABSTRACT

External root resorption is a problem with a multi-factor etiology. It is defined as a physiological or pathological activity, stemming mainly from the action of activated osteoclast cells and is characterized by the progressive or transitory loss of cementum or both cementum and dentin. In some cases, it can be induced through pressure exercised by orthodontic movements. Periodic radiography control before, during and after treatment is important for the detection of resorption. The aim of the present study is to offer some considerations regarding root resorption of a traumatic etiology in a 22-year-old Caucasian male whose radiographic exams exhibited Grade IV root resorption in the upper and lower anterior elements and the molars that served as anchorage. As initial radiography revealed conditions of normality, the causes of the resorption stemmed from the orthodontic treatment.

UNITERMS: root resorption, orthodontics, radiography.

1 - Mestre, Doutor, Professora Adjunta da Disciplina de Patologia Oral da UFPE.

2 - Mestre pelo programa de Pós-Graduação da Faculdade de Odontologia da UFPE.

3 - Aluna de Graduação em Odontologia da UFPE.

4 - Mestre, Doutor, Professora Adjunta da Disciplina de Radiologia Oral da UFPE.

5 - Mestre, Doutor, Professora Substituta de Patologia Oral- UFPE

INTRODUCTION

Orthodontics is characterized by the movement of teeth within the bone tissue. In order to promote this movement, pressure is applied to impel the tooth and its periodontium toward normal occlusion (PROFFIT, FIELDS, 2000). Displacement occurs due to the application of indicated forces, which cause the physiological phenomena of resorption and apposition. Among the side effects that may occur during orthodontic movement, root resorption merits special attention so that it may be minimized, as the rounding of the apexes is considered a consequence of the treatment (PARKER and HARRIS, 1998; TRONSTAD, 1998).

Root resorption was probably first described in 1530 by Michael Blum in Germany. It is divided into two main categories: physiological or normal, which occurs in the deciduous dentition; and pathological, which occurs in the permanent dentition. Depending on the affected surface, root resorption is also classified as internal or external. External root resorption has an etiology related to genetic, physiological and anatomical variables. These are general and local factors that predispose an individual to root resorption. Thus, tooth movement executed during orthodontic treatment constitutes a local factor.

According to Malmgren et al. (cited by Consolaro, 2005), apical tooth resorption induced by orthodontics is classified in Grades I, II, III and IV, depending on the magnitude of loss to the length of the tooth. When teeth exhibit irregular contours of the apical surface, resorption is classified as Grade I; reduction in root length by as much as 2mm is classified as Grade II; reduction between 2mm and 1/3 of the root is considered as Grade III; and Grade IV is a loss of more than 1/3 of the root. Root resorption attributed to orthodontic treatment is denominated surface and/or inflammatory resorption due to the continuity of the etiological factor over a long period of time, resulting in a more extensive and invasive pathology (RIBEIRO; SALES, 1998).

CLINICAL CASE REPORT

A 22-year-old Caucasian male appeared at the Dental Radiology Laboratory of the Universidade Federal de Pernambuco (UFPE) for a routine radiographic exam. In the periapical and panoramic radiographic exams performed for the documentation of the patient, radiolucent images were observed altering the root contours of the upper and lower anterior elements and molars (Fig.2,5,6). There was also an absence of the premolars (Fig.3,4). During the case history, the patient reported having undergone orthodontic treatment nine years earlier. In the initial panoramic radiograph, there was no evidence of abnormalities (Fig.1). No alterations were evidenced in the extra-oral and intra-oral exams. After the analysis

of the clinical and radiographic exams, the diagnosis was made of Grade IV.



Figure 1- Periapical radiograph displaying Grade IV resorption in the upper incisors.



Figure 2- Periapical radiograph displaying resorption in the lower incisors



Figure 3- Periapical radiograph displaying severe resorption in the upper lateral incisor, canine and premolars



Figure 4- Periapical radiograph displaying resorption in the lower incisors and canine



Figure 5- Periapical radiograph displaying resorption in the premolars and distal root of the lower first molar.



Figure 6- Image displaying resorption in the region of the upper premolars



DISCUSSION

External root resorption is triggered by a functional imbalance between osteoblasts and osteoclasts, which in normal clinical situations maintain or remodel the periodontal support structures (DUMFAHRT and MOSCHEN, 1998). External root resorption does not generally compromise the vitality and stability of the tooth.

Although root resorption is a cause-effect of orthodontic treatment, the principal cause remains essentially unknown. It is likely induced by the compression of the periodontal ligament and concomitant hyalinization (MALTHA *et al.*, 2004). The initial attack on the root generally occurs in the location nearest the periphery of the hyalinized area as an adverse effect of cell activity associated to the removal of the hyalinized tissue formed in consequence of the orthodontic pressure. The loss of root material occurs adjacent and subjacent to the hyalinized area (RUELAS and BOLOGNESE, 2000).

In a study evaluating external apical resorption of incisors subjected to orthodontic treatment, Martins *et al.* (2005) found that the lateral incisor was the most affected by the resorption in treatment modalities with and without the extraction of the first premolars. Someshina and Sinclair (2004) point out that the risks increase in resorption when the roots have an abnormal shape, when there is pressure from the tongue or apical horizontal displacement.

Nadier (2006) stresses that root resorption is a multi-factor process as a consequence of damage to the periodontal ligament, which often stems from an endodontic, orthodontic or periodontal process, and not only caused by acute trauma. The author also points out that this pathology is most often clinically asymptomatic. It can exhibit slight mobility and sensitivity to percussion. Through radiography, a radiolucent area can be identified with irregular edges located in different areas of the root. External root resorption can develop a progressive course and result in tooth loss.

Lindhe (2005) points out that attention must be paid to the fact that in the cervical region of the teeth, it may be difficult radiographically to differentiate cavities caused by caries from those caused by resorption.

Neville et al. (2004) state that if difficulties occur in the distinction between internal and external root resorption, Clark's method or Paralax should be employed, for thus the root resorption sites seem to move away from the root canal, as a comparison of radiographs can reveal.

Tooth resorption is currently diagnosed by means of radiography and affects between five and ten percent of the population worldwide. It can lead to tooth loss and there is a greater risk among individuals who wear orthodontic braces. Early diagnosis of tooth resorption includes the use of blood, saliva or tear samples to identify antibodies produced by the organism to destroy proteins in teeth damaged by accidents, teeth grinding or orthodontic braces (CONSOLARO, 2005). In the presence of Grade IV external root resorption, the prognosis is poor. Thus, a number of authors believe that the early detection of resorption improves the prognosis. This paper describes the radiographic accompaniment of a case of Grade IV external root resorption caused by orthodontic treatment.

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