



RSBO Revista Sul-Brasileira de Odontologia

ISSN: 1806-7727

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Universidade da Região de Joinville
Brasil

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RSBO Revista Sul-Brasileira de Odontologia, vol. 6, núm. 1, 2009, pp. 100-103

Universidade da Região de Joinville
Joinville, Brasil

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Case Report Article
Artigo de Caso Clínico

Healing of external root resorption associated with odontogenic keratocyst: case report

Reparo de reabsorção radicular externa associada com queratocisto odontogênico: relato de caso

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Received on February 12, 2008. Accepted on June 30, 2008.
Recebido em 12/2/08. Aceito em 30/6/08.

Keywords:

external root resorption;
odontogenic keratocyst;
calcium hydroxide.

Abstract

Introduction and objective: A case of external root resorption associated to an odontogenic keratocyst is presented. **Case report and conclusion:** A review of the pertinent literature revealed that this cyst is not considered a common etiological factor for external root resorption. X-ray examinations showed root resorption in the teeth involved in an odontogenic keratocyst. Root canal treatment with calcium hydroxide mixed with propylenglicol was performed. The paste was applied at definite intervals during a 10 month period. X-rays were taken at each interval. At final X-ray examinations showed no signs of root resorption and the filling was completed.

Resumo

Introdução e objetivo: Este trabalho apresenta um caso de reabsorção externa associada a um queratocisto odontogênico. **Relato do caso e**

Palavras-chave:

reabsorção externa da raiz dentária;
queratocisto odontogênico;
hidróxido de cálcio.

conclusão: A revisão da literatura pertinente revelou que tal cisto não é comumente associado à reabsorção externa da raiz. Exames radiográficos apresentaram reabsorção externa da raiz nos dentes envolvidos com a lesão cística. O tratamento endodôntico instituído utilizou hidróxido de cálcio juntamente com propilenoglicol aplicado como medicação intracanal em intervalos definidos durante 10 meses. Ao final do referido período o exame radiográfico demonstrou o reparo da reabsorção.

Introduction

External root resorption affects external or lateral surfaces of a single tooth or multiple teeth. The contributory factors implicated in external root resorption are periodontal infection, traumatic injury, orthodontic pressure, tooth bleaching and jaw cyst lesions [4, 15, 17].

Odontogenic keratocysts represent 5-15% of maxillary and mandible cysts [14]. Age range is ample and the greatest incidence is in the second and third decade of life. They occur in the maxilla and mandible, more commonly in the mandibular third molar and the ramus areas [1], and are originated from residue cells of the dental lamina [2]. They have a greater tendency of recurrence than nonkeratinizing cysts [13]. They have the highest recurrence rate of any odontogenic cyst treated conservatively by surgical curettage [10]. Radiographic appearance could be unilocular or multilocular; the former is more common, the later is larger in most cases [6]. These aggressive lesions may show bone expansion and displacement of teeth [14]. Displacement is more frequent than root resorption [7, 16].

This case reports an external root resorption, associated with an odontogenic keratocyst, and also the subsequent treatment with calcium hydroxide to resolve root resorption.

Case report

A 33-year-old male was referred by his maxillofacial surgeon to the Post-Graduate School of Endodontics at the Universidad Autónoma de San Luis Potosí, San Luis Potosí, Mexico. Surgical procedure to enucleate a mandibular Odontogenic Keratocyst was performed a month before the visit. Odontogenic Keratocyst diagnosis was confirmed by histological examination.

A panoramic X-ray (figure 1) prior to surgery showed an extensive multilocular radiolucent area that went from the mandibular left first molar to the mandibular right first molar. Radiolucency was related to roots of mandibular

teeth. Mesial and distal roots of the mandibular left first molar presented external root resorption. Both mandibular left premolars also showed resorption. Periapical X-ray (figure 2) confirmed the signs showing severe external root resorption in the mandibular left first molar and moderate external root resorption in the mandibular left premolars. Mandibular left first molar and the mandibular left first and second premolars had a negative response to vitality tests.

Endodontic treatment was performed in these teeth. Treatment consisted of mepivacaine (1/100,000 epinephrine), rubber dam placing and cameral access. The apex locator gave an unreliable root length. A K-File and an X-ray were used to obtain the working length. Hand files Flex-O-File (Dentsply-Maillefer Instruments SA, Ballaigues, Switzerland) and Gates Glidden burs (Dentsply-Maillefer Instruments SA, Ballaigues, Switzerland) were used to clean the root canal. Calcium Hydroxide Powder (Viarden, Mexico City, Mexico) mixed with Propylenglicol (Hycel de Mexico, Mexico City, Mexico) was placed as intracanal medication. Coronal access was sealed with IRM paste (Dentsply Caulk, Milford, Delaware, USA). Calcium Hydroxide paste was replaced in booth premolars three months later. At this time, treatment of the mandibular left first molar was performed under the same previously mentioned conditions.

Six months later, X-ray control showed an apical radiopaque bridge on the mandibular left first premolar (figure 3), thus the tooth was filled with a lateral modified condensed technique. At seven months, the radiographic control showed a similar apical radiopaque bridge in the second left mandibular premolar; the tooth was filled under the same conditions. Root resorption had stopped as seen on the 10 month X-ray control. Root resorption stopped in all three teeth by using calcium hydroxide and propylenglicol paste (figure 4).

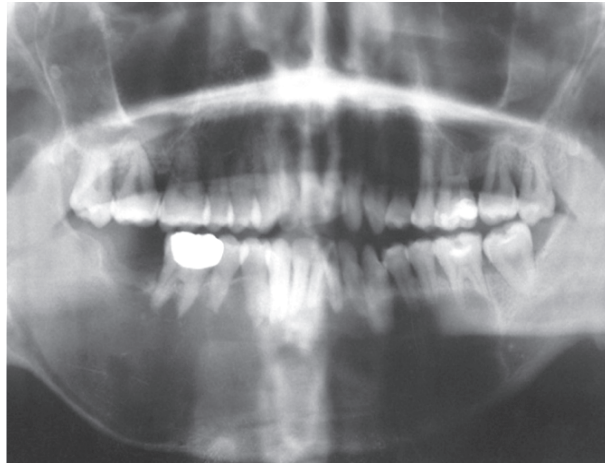


Figure 1 – Initial panoramic X-ray

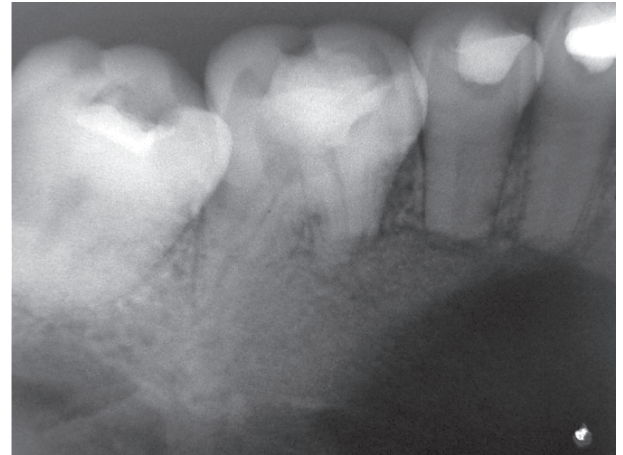


Figure 2 – Initial periapical X-ray



Figure 3 – Six months, X-ray control



Figure 4 – Seven months, Root canal obturation, X-ray control

Discussion and conclusion

Most of cases of odontogenic keratocysts are located in the mandible [1]. They are related to single tooth or multiple teeth. In these teeth, root resorption is less frequently than tooth movement [7, 16]. Partridge and Towers [12] reported 60 cases of keratocysts, Haring and Van Dis [6] reported the same number of cases in a different study. Findings were 5% for the former and 11% for the later studies.

In a recent study, Chirapathomsakul *et al.* [3] in 51 cases of keratocyst found that only one case showed root resorption. This paper reports a case of external root resorption associated to an odontogenic keratocyst. Surgical treatment of the cyst was performed before the patient's visit. The cyst comprised the mandible body, from the first mandibular left molar to the first mandibular right molar. The radiographic border of the cyst included the roots of the mandibular teeth and affected the mandibular left first molar and both left premolars. These teeth showed an active root resorption.

Yonetsu *et al.* [20] reported a case of a 37-year old man with an odontogenic keratocyst. Panoramic X-ray showed a unilocular lesion extending from midline toward the symphysis of the mandible to the posterior left molar area. None of the teeth in that region presented root resorption, although the lesion was large. Kendall [8] reported a case of a 17-year old male with an odontogenic keratocyst. Radiographic examination showed an impacted lower left third molar located between the distal root of the first permanent molar and the mesial root of the second premolar. An extensive root resorption of the first molar and moderate resorption in the second premolar was observed here. First molar showed root resorption probably caused by the impacted

third molar [9, 19], even though the second premolar also presented resorption without similar stimuli.

There have been reports that periapical cyst lesion stimulate microscopic root resorption [18]. It may possibly occur in other cysts as in the odontogenic keratocyst. Probably in some cases root resorption increases by a pathological mechanism. Oka *et al.* [11] showed that the Interleukin-1 α , prostaglandin E $_2$ and precursors of matrix metalloproteinases pro MMP1, pro MMP2, pro MMP3 are secreted by epithelial cells or fibroblast *in vitro*. All of these stimulate the osteoclastic differentiation or bone resorption. Probably this mechanism stimulates osteoclasts like multinucleated cells and formed osteoclasts that act over the radicular surfaces with consequents external root resorption.

Calcium hydroxide has been recommended for the treatment of root resorption. It increases pH in dentin. Therefore, it inhibits the activity of osteoclast acid hydrolases in the periodontal tissues and activates alkaline phosphatases [5]. In this report, the placement of calcium hydroxide paste was effective in stopping external root resorption in the three teeth that were involved. To conclude, the intracanal medication performed well as an alternative treatment for external root resorption associated with odontogenic keratocyst.

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