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Conservative surgical-orthodontic treatment of a young patient with a dentigerous cyst

Tratamento cirúrgico conservador e ortodôntico em paciente jovem com cisto dentígero

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Resumo

Introdução: Cisto dentígero é um cisto odontogênico de desenvolvimento cuja abordagem terapêutica depende do tamanho da lesão. A proposta desse relato foi descrever o tratamento realizado em um paciente do gênero masculino de 14 anos de idade portador de cisto dentígero envolvendo o segundo molar permanente inferior esquerdo. **Relato de caso:** Foi realizada a exodontia do primeiro molar permanente inferior esquerdo e a lesão foi descomprimida e marsupializada através de um dreno de acrílico suturado na mucosa. O espécime retirado durante o ato cirúrgico confirmou o diagnóstico de cisto dentígero. Após 90 dias, houve diminuição significativa da lesão. Em seguida, iniciou-se o tratamento ortodôntico, que incluiu o tracionamento do dente impactado e a abertura de um espaço adequado com um aparelho fixo, proporcionando alinhamento e nivelamento favoráveis. **Conclusão:** A marsupialização e o tracionamento ortodôntico devem ser considerados quando se planeja o tratamento de cisto dentígero, principalmente em pacientes jovens com lesões extensas, a fim de preservar estruturas nobres adjacentes à lesão.

Descritores: Cisto dentígero; descompressão cirúrgica; ortodontia corretiva.

Abstract

Introduction: The dentigerous cyst is a developmental odontogenic cyst, whose therapeutic approach depends on the size of the lesion. This paper describes the treatment performed on a 14-year-old male patient who presented with a large dentigerous cyst on the permanent mandibular left second molar. **Case report:** The permanent mandibular left first molar was extracted, and the lesion was decompressed and marsupialized by excision of the overlying mucosa, opening a window into the cystic cavity and suturing an acrylic resin drain to the oral mucosa. The specimen removed during surgery confirmed the diagnosis of a dentigerous cyst. Within ninety days of surgery, there was a significant reduction in lesion size. Orthodontic treatment was then started, and included traction of the impacted tooth and opening of adequate space with a fixed appliance, providing favorable tooth alignment and leveling. **Conclusion:** Marsupialization and orthodontic traction should be considered when planning the treatment of a dentigerous cyst, mainly in young patients with large lesions, to avoid damage to the surrounding structures.

Descriptors: Dentigerous cyst; decompression surgical; orthodontics corrective.

INTRODUCTION

The dentigerous cyst is the second most common type of developmental odontogenic cyst, accounting for approximately 20% of all true cysts of the jaws[1]. It develops in two ways: by accumulating fluid between the reduced enamel epithelium (REE) and the crown of an embedded tooth, or by accumulating fluid between layers of the REE[2,3]. Dentigerous cysts are asymptomatic, except if secondarily infected, and are generally discovered through a panoramic radiographic examination[2,4]. Dentigerous cysts can reach a considerable size after some time[4], and can cause expansion of the cortical bone followed by facial asymmetry, pain, tooth displacement and root resorption[5].

The diagnosis of the dentigerous cyst includes clinical, radiographic, and histopathological aspects. Radiographically, the lesion presents as a radiolucent, unilocular area with well-defined borders, and is associated with an embedded tooth[6]. A normal follicular space measures 3 to 4 mm; when a follicular space measuring more than 5 mm is observed, a dentigerous cyst is suspected[7]. The histopathological criteria include the presence of a fibrous capsule with minimal inflammatory cells and covered by stratified squamous nonkeratinized epithelium with 4 to 6 layers of cells[6].

The treatment proposed for dentigerous cysts depends on the extension of the lesion. Small lesions can be surgically removed in order to prevent harm to the succeeding permanent tooth[8], whereas decompression and marsupialization are indicated as the primary treatment approach for more extensive lesions,

favoring both lesion reduction[7,9] and eruption of the impacted tooth. When spontaneous eruption does not occur, orthodontic traction is indicated[7,10].

This article reports a case of a dentigerous cyst associated with an impacted tooth in a teenage patient, where a multidisciplinary approach was taken, including conservative surgery and orthodontic traction.

CASE REPORT

A 14-year-old male patient of mixed African-European descent was seen at the Stomatology Clinic of the School of Dentistry, Federal University of Alfenas, Alfenas, MG, Brazil, showing an asymptomatic lesion on the right side of the mandible. The lesion was discovered on a panoramic radiographic exam, which was requested to investigate into the non-eruption of the permanent mandibular second molars. The patient denied any trauma or infection in this area. His medical history was unremarkable. No significant changes were noted during the intraoral examination. The panoramic radiographic exam showed a radiolucent, unilocular lesion associated to the crown of the unerupted mandibular left second molar, surrounded by a slightly opaque halo extending from the mesial aspect of the mandibular left second premolar to the vicinity of the unerupted mandibular left third molar. The lower limit of the lesion was close to the basilar portion of the mandible (Figure 1).

The diagnostic hypotheses were dentigerous cyst and inflammatory follicular cyst. The proposed treatment was extraction of the permanent mandibular left first molar, owing to extensive root resorption, cystic decompression and placement of an acrylic resin drain (Figure 2).

An incisional biopsy was performed and the microscopic analysis of the specimen revealed a cystic cavity lined by a cuboidal, nonkeratinized, thin, stratified, squamous epithelium and a capsule of dense fibrous connective tissue. A flat epithelial-connective tissue interface was observed (Figure 3).

Based on the observation of radiographic and microscopic aspects, the diagnosis was made of a dentigerous cyst. The acrylic resin drain was kept in place for 90 days, after which a marked decrease in lesion size and eruption of the mandibular left third molar were observed (Figure 4).

Figure 1. Panoramic radiograph showing a radiolucent area related to a permanent mandibular left second molar.

Extraction of the permanent mandibular right first molar was performed at this time. Three months later, orthodontic treatment was initiated, consisting of the placement of fixed inferior and superior appliances, according to the Edgewise prescription (Edgewise Slim, Morelli, Sorocaba, SP, Brazil). Cementation of orthodontic bands was performed on the mandibular left and right third molars. A stainless steel open coil spring and a .014-in NiTi archwire were used both to make space for the permanent mandibular second molars and to verticalize the mandibular third molars. Traction of the mandibular permanent left second molar was initiated by bonding an orthodontic button to its occlusal surface. The button was then fastened to a 0.30 mm wire ligature, which, in turn, was tied to the archwire. Six months after placing the fixed appliance, the button was removed, and leveling and alignment of the permanent mandibular second molars were completed. Sixteen months after traction was initiated, a panoramic radiograph showed the permanent mandibular second molars and mandibular third molars aligned, leveled and correctly positioned on the arch, exhibiting parallel roots and no apical resorption. The patient is still under follow-up, and, three years after the beginning of treatment, shows no signs of lesion recurrence. The orthodontic treatment was considered successful (Figure 5).

Figure 2. Placement of an acrylic resin drain for decompression.

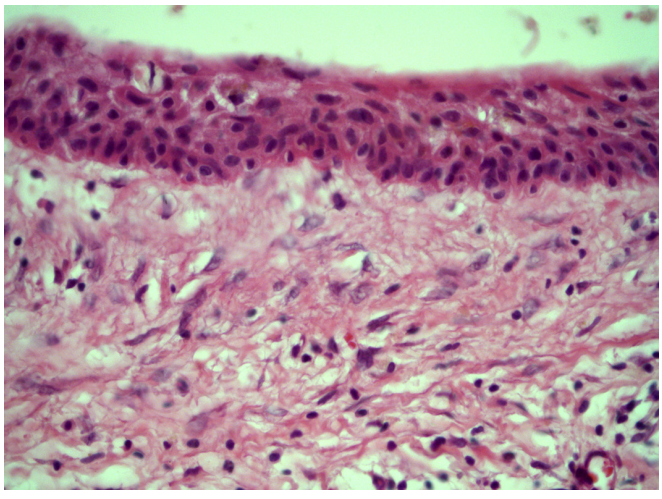

Figure 3. Cystic wall composed of fibrous tissue lined by a thin, stratified, squamous, nonkeratinized epithelium (H&E, 400x).

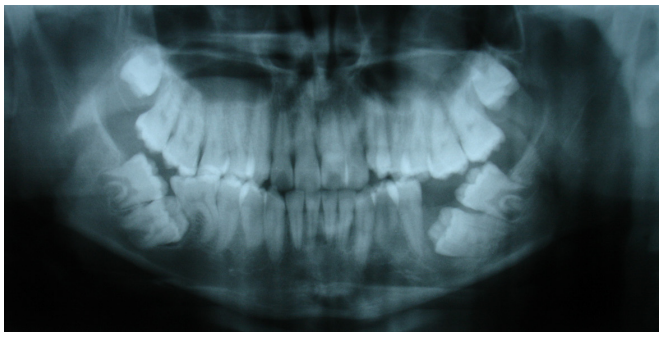

Figure 4. Panoramic radiograph showing a significant decrease in lesion size and eruption of the mandibular left third molar.

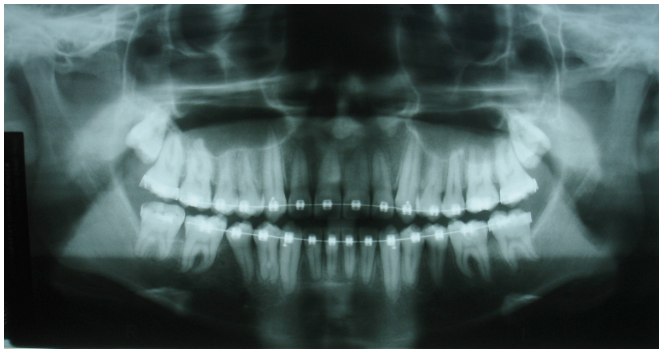

Figure 5. Panoramic radiograph showing no signs of lesion recurrence three years after the beginning of treatment. The teeth are aligned, leveled, and correctly positioned on the arch, showing parallel roots and no apical resorption.

DISCUSSION

Dentigerous cysts represent 30% of all odontogenic jaw cysts[9]. The majority of these cysts occur in males of European descent[6,11], although Avelar et al.[12] (2009) have found a predominance among subjects of African descent, as in the present case. They occur most commonly in the second and third decades of life, and their frequency declines with age[11]. Dentigerous cysts seldom occur in the first decade of life, but there are reports in patients with ages ranging from 1[4] to 99 years[11]. They may occur in the maxilla or in the mandible, and are more frequently associated to mandibular third molars and upper anterior teeth. The present case shows a dentigerous cyst associated to the permanent mandibular second molar. Sharifian, Khalili[13] (2011) report that only 10.4% of the odontogenic cysts associated to permanent first and second molars were dentigerous cysts.

The exact histogenesis of the dentigerous cyst is still unknown. It is believed that the cyst develops around the impacted tooth crown by accumulation of fluid either between the reduced enamel epithelium and the enamel, or between the layers of the enamel organ[2,3]. This fluid accumulation occurs as a result of pressure exerted by a potentially erupting tooth on an impacted follicle that obstructs the venous outflow, thereby inducing rapid transudation of serum across the capillary walls[2]. The accumulation of fluid associated with the degradation of the follicle cells causes an increase in osmotic pressure and cystic formation. This osmotic pressure increase also causes the lesion to enlarge. An additional factor potentially stimulating lesion growth is the presence of the parathyroid hormone-related protein receptor (PTHrP) in the epithelial cells and in the fibrous capsule of the dentigerous cyst. This protein is a potential inducer of osteoclastogenesis, and is correlated to an increase in bone resorption[14].

The treatment for dentigerous cysts depends on its size and location. Moreover, one should also consider the patient's age, the teeth involved, and the involvement of other anatomic structures as basic criteria for choosing the appropriate treatment modality[4]. In children, marsupialization or decompression is generally preferred as a more conservative intervention, compared to complete enucleation of the cystic lesion, aimed at preventing any damage to the crowns of the developing permanent teeth[15]. Decompression may serve as a primary treatment of odontogenic cysts, leading to a significant reduction in lesion size. The aim of marsupialization or decompression is to relieve intracystic pressure through an accessory cavity, and to reduce the size of both the lesion and the bone defect. Nevertheless, secondary and definitive surgery following decompression is recommended in aggressive cystic lesions[8,9]. It is also believed that a shorter decompression period is needed for young patients[9].

The benefits of marsupialization and decompression include a gradual decrease in the cystic cavity, preservation of oral tissues, maintenance of the vitality of the dental pulp, prevention of tooth extraction, prevention of damage to the adjacent anatomic structures (inferior alveolar nerve, maxillary sinus, nasal cavity), prevention of mandible fracture and a decrease in the risk of recurrence[16,17]. It should be stressed that proper cleaning of the cystic area is essential to induce a more favorable tissue response and to prevent infection[9].

Orthodontic traction of the impacted tooth has often been performed after marsupialization as a means of preserving the tooth associated with the cyst and facilitate its eruption. It is a technique that does not cause significant discomfort to the patient[18]. A device often used for this purpose, with favorable results, is a metallic orthodontic button[19]. Its reduced size, round contour, ease of bonding, and ease of adaptation to the archwire, contribute to its performance. Resin coverage after bonding is recommended to reduce friction against gingival tissues, and to lessen irritation to the adjacent tissues during the traction process[20]. In addition to traction, orthodontic treatment of an impacted tooth usually includes the opening of adequate space with a fixed appliance to provide more favorable alignment and leveling[10]. This was the approach adopted in the present case.

Marsupialization should be considered when planning the treatment of a dentigerous cyst to avoid damage to the surrounding structures, mainly in young patients with large lesions. Dentists play an important role in the early diagnosis and treatment of dentigerous cysts. Furthermore, a multidisciplinary approach is required, as illustrated in our case, involving several specialists, such as a stomatologist, an oral and maxillofacial surgeon, an oral pathologist, and an orthodontist.

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CONFLICTS OF INTERESTS

The authors declare no conflicts of interest.

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