Large buccal bifurcation cyst in a child:
a case report and literature review

ABSTRACT

Background WHO defines the mandibular buccal bifurcation cyst as a cyst occurring near the cervical margin of the lateral aspect of a root as a consequence of inflammatory process in a periodontal pocket. The pathogenesis of these cysts is still debated, but they are most likely originated from reduced enamel epithelium or from inflammatory proliferation of epithelial cell rests of Malassez that come from the superficial mucosa of a tooth in eruption. The aim of this article was to describe a case of large buccal bifurcation cyst of a permanent mandibular first molar.

Case report A 6-year-old boy was referred to Department of Oral Rehabilitation of the Istituto Stomatologico Italiano, University of Milan, Italy, with the complaint of hard swelling over the buccal gingiva and a deep probing depth located on the buccal aspect. Radiograph revealed a well-defined semilunar-shaped radiolucency, marked by a fine radiopaque line on the buccal aspect of the partially-erupted lower right first molar and it was large enough to include a small part of the crown of the second right molar. As reported in the literature the treatment of choice is enucleation and curettage of the lesion without extraction of the vital involved tooth. This procedure has shown excellent results in both the short- and long-term. The definitive diagnosis of paradental cysts can be assessed by histopathologic analysis.

Keywords Buccal bifurcation cyst; Cyst enucleation; One stage surgery.

Introduction

Mandibular buccal bifurcation cysts were originally described in 1930 by Hofrath [1930]. Main, in 1970, proposed the term “inflammatory collateral cyst” [Main, 1970], recognising the inflammatory nature, even if the current nomenclature was suggested by Craig in 1976 [Craig, 1976]. Mandibular juvenile paradental cysts (JPCs) [Shear and Speight, 2008], mandibular infected buccal cysts [Stoneman and Worth, 1983], mandibular buccal bifurcation cysts [Pompura et al., 1997] have also been termed inflammatory lateral periodontal cysts [Main, 1985] and inflammatory paradental cysts [Vedtofte and Praetorius, 1989].

According to the World Health Organization (WHO), the mandibular buccal bifurcation cyst is a cyst occurring near to the cervical margin of the lateral aspect of a root as a consequence of an inflammatory process in a periodontal pocket [Kramer et al., 1992]. The distinctive form of the paradental cyst occurs on the buccal and the distal aspects of erupted mandibular molars, most commonly the third molars, where there is an associated history of pericoronitis [Kramer et al., 1992]. The pathogenesis of these cysts is still debated, various hypotheses were formulated, but they are probably originated from the reduced epithelium of enamel [Craig, 1976; Colgan et al., 2002] or from the inflammatory proliferation of epithelial cell rests of Malassez [Ackermann et al., 1987; Fowler and Brannon, 1989] that come from the superficial mucosa of a tooth in eruption: pericoronitis. These lesions represent about 5% of all odontogenic cysts [Craig, 1976; Colgan et al., 2002; Jones et al., 2006; Souza et al., 2001] and are associated with vital mandibular first and second molars in children aged 5 to 8 years. Radiographically, these lesions appear as radiolucencies on the buccal aspect of the involved tooth, covering the root system to a variable extent; involvement of the periosteum may cause new bone to be formed as single or laminated linear bands [Shear and Speight, 2008].

The aim of this article is to present a large buccal bifurcation cyst in a child, discussing diagnosis, radiographic features and treatment of the lesion.

Case report

A 6-year-old boy was referred to Department of
Oral Rehabilitation of the Istituto Stomatologico Italiano, University of Milan, Italy, with the complaint of hard swelling over the buccal gingiva (Fig. 1) and a deep probing depth located on the buccal aspect of his erupted mandibular right first molar. Clinically, there were no signs of inflammation and the mucosa around the first molar was clinically healthy whereas the pulp test for the first molar was positive. The evaluation of panoramic radiograph (Fig. 2) showed a well-defined semilunar-shaped radiolucency, demarcated by a fine radiopaque line on the buccal aspect of the partially-erupted lower right first molar. Cone Beam Computed Tomography (CBCT) revealed and confirmed the presence of the radiolucent lesion on the right side of the mandible extended for 16.4 mm (Fig. 3) from the cementoenamel junction to the lower root margins of the first molar and 13.6 mm (Fig. 4) from the roots of first molar to the crown of second molar. Clinical, radiographic and anamnestic features suggested the initial diagnosis of paradental cyst.

It was decided for surgical cyst removal under general anaesthesia, without extraction of the teeth involved.

The surgical approach was a full-thickness trapezoidal flap, with gingival crevicular incision and vertical releasing incisions. A buccal ostectomy was performed (Fig. 5, 6), taking care to preserve a sufficient band of cortical bone in the coronal aspect. The cyst was exposed and then enucleated through the surgical access, without the need to extract the tooth. Following irrigation with saline 4-0 absorbable sutures were placed.

The histological analysis revealed that the cyst capsule was lined by a proliferating, non-keratinised, stratified squamous epithelium, showing an arcading pattern. The cystic wall consisted of a dense, mature fibrous connective tissue, with an intense chronic inflammatory reaction characterised by mononuclear and polymorphonuclear cells, mainly near the epithelium. The histopathology associated with macroscopic and radiographic examinations permitted the definitive diagnosis of paradental cyst on the mandibular right first molar.

Discussion

Paradental cysts represent 3–5% of all odontogenic cysts [Craig, 1976; Colgan et al., 2002; Jones et al., 2006; Souza et al., 2001]. The majority of paradental cysts (61%) involve the mandibular third molars during the third decade of life; a minority, 36%, are located on the buccal surface of the mandibular first or second molars [Shear and Speight, 2008; Philipsen et al., 2004; Borgonovo et al, 2010; Borgonovo et al. 2013]. Since the radiological features differ according to the tooth involved [Jones
et al., 2006], the paradental cysts developed on the first and second lower molars, are also called “juvenile paradental cysts” by Craig in 1976 [1976]. The average age of patients with paradental cysts of the lower first molar is 8-9 years old, whereas cysts of the second molar appear between age 13 to 20 years. Bilateral cysts are found in 23.6% of the cases [Philipsen et al., 2004; Borgonovo et al., 2012].

In regard to the lower third molars, these lesion can be considered the second most frequent cysts, representing up to 25% of the cystic lesions associated with these teeth, although they represented only 1.6% of the cystic lesions analysed by Colgan et al. [2002].

Paradental cysts are usually found in the mandible, almost always on distal or buccal aspect of a completely or partially erupted molar tooth, always vital. While the mesial aspect can be involved in rare cases, the lingual aspect is never involved [Ackermann et al., 1987; Philipsen et al., 2004].

The association between tooth eruption and cyst appearance supports the inflammatory aetiology during eruption, which causes epithelial proliferation and cyst formation [Colgan et al., 2002; Souza et al., 2001; Philipsen et al., 2004; Puranik and Vanaki SS, 2007; Vucicevic Boras et al., 2007; Borgonovo et al., 2013]; the epithelial cell rests of Malassez seem to be the most likely origin, although they do not completely explain cyst located near the roots [Souza et al., 2001]. The nearly exclusive involvement of the buccal surface can be explained by the fact that the mesiobuccal cuspids are the first to pierce the mucosa during eruption, and consequently, the first to be exposed to the oral microsystem [Stoneman and Worth, 1983].

Some authors [Pompura et al., 1997] have used the term mandibular buccal bifurcation cyst to identify JPCs of the first molar; this site- and age-specific description emphasises the location of the cyst (always the buccal surface) and the consistent association with the buccal bifurcation. The cystic walls, in our case, were tightly attached to the radicular furcation and the extension of the cyst was so large to involve a small part of the crown of the lower second molar.

JPCs are not easily distinguished from other lesions such as inflamed dentigerous cysts, inflamed follicles, giant cell granulomas, radicular cysts and lateral developmental periodontal cysts. JPCs can present variable clinical and radiographic signs [Craig, 1976] and can be confused with radicular cysts at the microscopic examination; for these reasons, it is mandatory to correlate all clinical, radiographic and histological data to obtain the definitive diagnosis. Moreover the differential diagnosis with lateral and radicular cyst is given by the fact that in these latter cases the electric pulp test of the tooth involved is negative.

In this article, the authors present a case of a large buccal bifurcation cyst involving the first permanent mandibular molar and part of the second molar crown. The CBCT images were characterised by well-defined radiolucency associated with the roots on the buccal aspect. Our case presented with few clinical symptoms, in agreement with the observation that JPCs frequently cause mandibular buccal bone expansion and hard swelling over the gingiva, without pain. The expansion of the buccal bone plate is often the first detectable clinical sign that may lead to the diagnosis of this lesion. The increased periodontal probing depth observed in the case is another important diagnostic feature. This characteristic in association with the radiographically visible integrity of the lamina dura and apical periodontal spaces may support a periodontal aetiology. Moreover, surgical findings, such as bony cavitation and cystic content can give some important clues. Enucleation of the lesion without extraction the associated tooth, is indicated when the second or, as our case, the first molar are involved [Philipsen et al., 2004; Packota et al., 1990; Bsoul et al., 2002; Martinez-Conde et al., 1990; Camarda et al., 1989; Borgonovo et al., 2012; Borgonovo et al., 2010; Borgonovo et al., 2013]. The treatment objective is restoring the morphology and function of the affected area.

In the literature two basic surgical procedures are reported: two-stage protocol (marsupialisation first and enucleation after decompression), or one-stage protocol (only marsupialisation or only enucleation). Enucleation with primary closure is the treatment of choice [Martinez-Conde et al., 1990; Borgonovo et al., 2010; Borgonovo et al., 2013]. It is a one-stage surgical treatment followed by periodic radiographic follow-ups at regular intervals to monitor bone healing; it also allows histopathologic examination of the specimen for final diagnosis. Enucleation can be performed only when the jaw bone adjacent to the cyst is intact. If the CT shows erosion in the vestibular or lingual cortex, marsupialisation is the treatment of choice [Bodner et al., 1994].

Pompura et al. [1997] described the successful treatment of 44 buccal bifurcation cysts by enucleation without concomitant extraction in children aged 5.5 to 11 years. A similar successful treatment was reported by Thikkurissy [2010], and Vedtofte and Praetorius [1989]. These authors presented 13 cases involving the mandibular first and second molars that were treated without extraction with two recurrences.

**Conclusion**

The buccal bifurcation cyst is an odontogenic cyst, frequently associated with permanent molars in paediatric subjects.

Given the young age of the patients and the localisation of the lesion, involving important teeth such as molars are, the most conservative surgical treatment is imperative. For these reason the treatment of choice...
is a one-stage surgical protocol with simple enucleation and curettage of the lesion without extraction of the vital tooth involved. This procedure has shown excellent results in both the short- and long-term as shown in the literature.

References