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Case Report

Buccal Bifurcation Cyst Associated with Mandibular Second Molars: Report of Two Pediatric Cases

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ABSTRACT

Buccal bifurcation cyst (BBC) is an uncommon inflammatory odontogenic cyst that predominantly affects the buccal aspect of partially erupted mandibular molars in children. Because its histopathological features are nonspecific, diagnosis relies on careful clinicopathological correlation.This report describes two pediatric cases of BBC associated with mandibular second molars, including a rare bilateral presentation. Both patients presented with buccal swelling, and imaging revealed well-defined radiolucent lesions associated with vital mandibular molars. Conservative surgical enucleation with preservation of the involved teeth was performed in both cases. Histopathological examination demonstrated cystic lesions lined by non-keratinized stratified squamous epithelium with chronic inflammatory infiltrate, confirming the diagnosis when correlated with the clinical and radiographic findings. No recurrence was observed during follow-up, and spontaneous eruption of the affected teeth occurred. These cases emphasize the

importance of considering BBC in the differential diagnosis of radiolucent lesions associated with vital, fully or partially erupted mandibular molars in children and adolescents. Early recognition and conservative management allow preservation of the involved teeth and result in favorable clinical outcomes.

Key words: Odontogenic cyst, Jaws, Mandible.

Statement of Clinical Significance

Buccal bifurcation cyst is an uncommon inflammatory odontogenic cyst that can mimic other lesions affecting mandibular molars in children. Accurate diagnosis requires careful correlation of clinical, radiographic, and histopathological findings, particularly because the involved teeth are typically vital. Early recognition allows conservative surgical management while preserving the affected tooth and facilitating normal eruption.

1. INTRODUCTION

The buccal bifurcation cyst (BBC) is an uncommon inflammatory odontogenic cyst that typically develops along the buccal surface of a partially or fully erupted mandibular first or second molar, most commonly in children during their first decade of life[1,2]. It is currently classified as a collateral inflammatory odontogenic cyst (CIC) and accounts for approximately 0.9%–4.7% of all odontogenic cysts[3,4].

Clinically, BBC usually presents as a buccal swelling in the molar region, which may delay or partially inhibit tooth eruption and is occasionally associated with deep periodontal pockets on the buccal aspect of the affected tooth[1-5]. Secondary infection may lead to symptoms such as pain, purulent discharge, and facial swelling[1,2]. Radiographically, it typically appears as a well-defined unilocular radiolucency with a sclerotic margin located on the buccal aspect of the affected molar and extending toward the furcation region. Although most cases are unilateral, bilateral involvement has occasionally been reported[1,5].

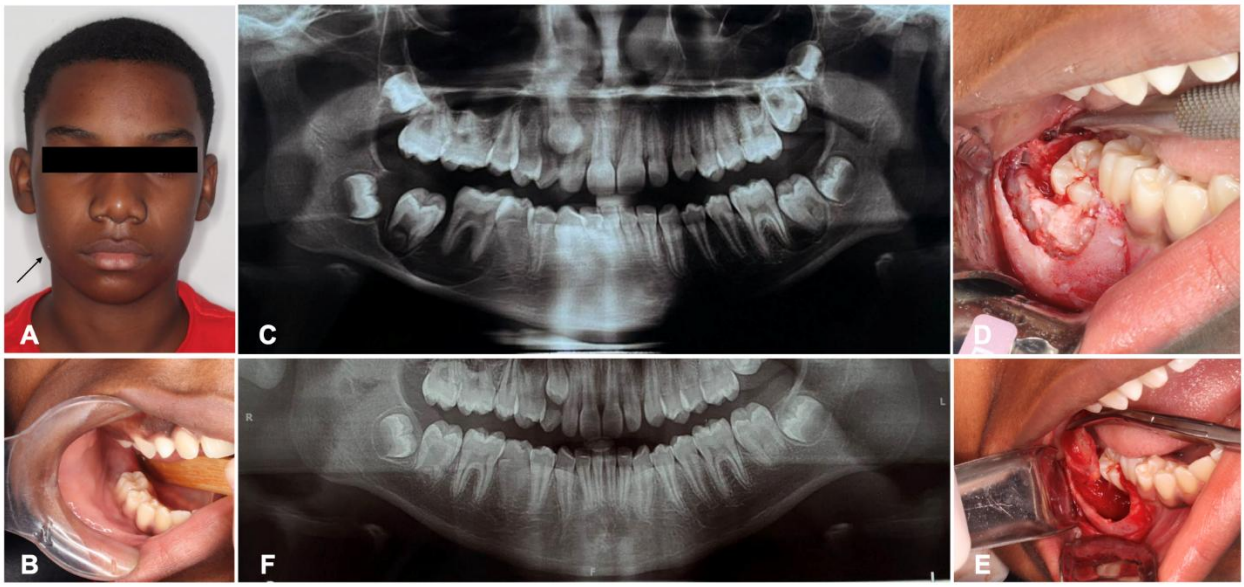
The exact pathogenesis of BBC remains uncertain, but the most widely accepted hypothesis suggests that chronic inflammation associated with the eruption of mandibular molars stimulates proliferation of odontogenic epithelial remnants, leading to cyst formation[1,2-4]. Because its histopathological features are nonspecific and overlap with those of other inflammatory odontogenic cysts, the diagnosis relies on careful correlation of clinical, radiographic, surgical, and microscopic findings[1-6].

This report describes two pediatric cases of buccal bifurcation cyst associated with mandibular second molars, including a rare bilateral presentation, highlighting their clinical, radiographic, histopathological, and therapeutic features.

2. CASE REPORT

Case 1

A 12-year-old male presented with a two-week history of facial swelling. His medical history was non-contributory, and no deleterious habits were reported. Extraoral examination revealed a mild, tender swelling on the right side of the face, whereas intraoral findings were unremarkable (Figure 1A–B).



Panoramic radiography demonstrated a well-defined, unilocular radiolucent lesion in the right posterior mandible associated with the partially erupted mandibular second molar (#47), extending slightly toward the first molar region. A second lesion with similar radiographic characteristics was identified on the contralateral side, associated with the partially erupted left mandibular second molar (#37) (Figure 1C). Both mandibular first molars responded positively to pulp vitality testing, and no signs of periapical pathology were observed.

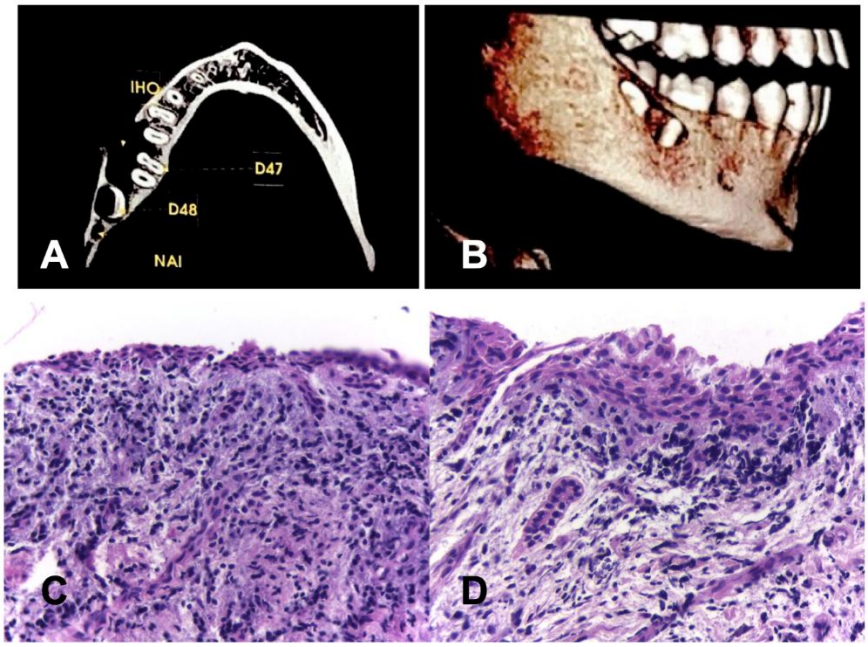
The differential diagnosis included buccal bifurcation cyst (BBC), radicular cyst, and dentigerous cyst. BBC was considered the most likely diagnosis because of the lesion's characteristic location on the buccal aspect of partially erupted mandibular second molars, the positive pulp vitality of the adjacent first molars, and the absence of periapical pathology. A dentigerous cyst was considered less likely because the radiolucency was centered in the furcation region and extended along the root surfaces rather than surrounding only the crown.

Under local anesthesia, excisional biopsy was performed. Following elevation of a mucoperiosteal flap, both cystic lesions were enucleated while preserving the associated teeth (Figure 1D–E). Histopathological examination revealed cystic cavities lined by non-keratinized stratified

squamous epithelium of variable thickness with focal epithelial hyperplasia. The fibrous connective tissue wall exhibited a moderate chronic inflammatory infiltrate predominantly composed of lymphocytes and plasma cells. No epithelial keratinization, basal cell palisading, or ameloblastomatous epithelial changes were identified. Correlation of the clinical, radiographic, surgical, and histopathological findings confirmed the diagnosis of buccal bifurcation cyst. At the 24-month follow-up, no recurrence was observed, with spontaneous eruption of both mandibular second molars (Figure 1F).

Case 2

A 13-year-old female was referred by her pediatric dentist for assessment of a one-week history of painful intraoral swelling with purulent discharge. Her medical history was unremarkable. Clinical examination showed a tender swelling along the buccal aspect of the right mandibular first and second molars. Cone-beam computed tomography (CBCT) revealed a large, well-defined unilocular hypodense lesion in the posterior right mandibular region, associated with the right mandibular second molar, causing expansion and focal resorption of the buccal cortical plate (Figure 2A–B).



All associated teeth responded positively to pulp vitality testing.

The differential diagnosis included BBC, odontogenic keratocyst, and unicystic ameloblastoma because of the lesion size and cortical bone involvement. However, the lesion location, its association with a vital partially erupted mandibular second molar, and the clinical evidence of inflammation favored the BBC hypothesis.Therefore, an excisional biopsy was performed under local anesthesia. Histopathological examination demonstrated a cyst lined by non-keratinized

stratified squamous epithelium with chronic inflammatory infiltrate in the fibrous wall, without epithelial keratinization, basal palisading, or ameloblastomatous changes, excluding odontogenic keratocyst and unicystic ameloblastoma. Correlation of the clinical, radiographic, surgical, and microscopic findings confirmed the diagnosis of BBC(Figure 2C–D). The postoperative course was uneventful, and no recurrence was observed after 12 months of follow-up.

3. DISCUSSION

The buccal bifurcation cyst (BBC) was first described by Stoneman and Worth[7] in 1983 as the "mandibular infected buccal cyst–molar area." In 1992, the World Health Organization (WHO) recognized this entity as the "mandibular infected buccal cyst" in the histological classification of odontogenic tumors. In the current WHO Classification of Head and Neck Tumours[4], BBC is classified as a collateral inflammatory odontogenic cyst together with the paradental cyst, reflecting the shared inflammatory pathogenesis and clinicopathological features of these lesions.

Since its initial description, approximately 168 cases of BBC have been reported in the literature[8]. The lesion most frequently affects the mandibular first molar (65.51%)[8,9],, whereas involvement of the mandibular second molar is considerably less common, accounting for approximately 9.65% of reported cases[8,9]. A slight male predominance has been observed, with most cases occurring during the first and second decades of life (mean age: 8.47 years)[5-9]. The present report contributes two additional cases involving mandibular second molars, including a bilateral presentation. Bilateral BBC is a rare finding. The few cases reported in the literature share clinical features with the present case, including occurrence in children, involvement of erupting mandibular molars, preservation of pulp vitality, and favorable outcomes following conservative surgical treatment[1,2,5].

The etiopathogenesis of the BBC remains a subject of debate. The most widely accepted theory suggests that BBC represents an inflammatory collateral cyst arising from chronic inflammation within the buccal periodontal pocket of a partially erupted mandibular molar[1-4]. In this region, bacterial accumulation and persistent gingival inflammation may stimulate proliferation of epithelial remnants of the dental lamina or reduced enamel epithelium, ultimately leading to cyst formation in the bifurcation area. Anatomical factors, such as enamel projections or enamel pearls in the furcation region, may also predispose to plaque retention and localized inflammation, further contributing to the development of the lesion[5,6]. These mechanisms support the current concept that BBC belongs to the spectrum of inflammatory collateral cysts, together with the paradental cyst[1-6].

The diagnosis of BBC depends on careful clinicopathological correlation because its histopathological features are nonspecific. Microscopically, the lesion typically consists of a cystic cavity lined by non-keratinized stratified squamous epithelium of variable thickness associated with a chronically inflamed fibrous connective tissue wall[1-3,5-9]. These features overlap with those of other inflammatory odontogenic cysts and should therefore be interpreted together with the clinical and radiographic findings[7]. In the present cases, radicular cyst was excluded because the adjacent first molars were vital and showed no evidence of periapical disease. Dentigerous cyst was considered unlikely because the radiolucency was centered in the furcation region rather

than surrounding only the crown. In Case 2, odontogenic keratocyst and unicystic ameloblastoma were also considered because of the lesion size and cortical expansion; however, the absence of epithelial keratinization, basal palisading, and ameloblastomatous epithelial changes excluded these entities.

Management of BBC generally involves conservative surgical approaches, such as enucleation and/or marsupialization or decompression followed by enucleation, while preserving the associated tooth[5-10]. In selected cases, however, extraction of the involved tooth may be indicated, particularly when adequate access for complete lesion removal cannot be achieved, when the tooth has a poor prognosis, or when preservation is not feasible[7,11-15]. Although BBC is an inflammatory lesion, the involved molar typically remains vital, and endodontic therapy is not required, as pulp vitality is generally maintained after surgical intervention. Conservative treatment promotes spontaneous tooth eruption, bone regeneration, and a low recurrence rate[8-10]. Both patients in the present report were successfully treated by conservative enucleation with preservation of the involved teeth, and no recurrence was observed after 24 months in Case 1 and 12 months in Case 2.

Bilateral BBC is a rare finding. The few cases reported in the literature share clinical features with the present case, including occurrence in children, involvement of erupting mandibular molars, and favorable outcomes. However, treatment approaches have varied among reported cases. Stoneman and Worth[7], Trask et al.[11], and Martínez-Conde et al.[12] managed bilateral lesions by enucleation combined with extraction of the involved teeth. In contrast, Shohat et al.[13] treated the lesions by enucleation while preserving the associated teeth, Stanback et al.[14] reported successful management with marsupialization alone, and Galego et al.[15] described spontaneous resolution without surgical intervention.

The present cases reinforce the typical clinical and radiographic characteristics of BBC and highlight the importance of considering this entity in pediatric patients presenting with buccal swelling adjacent to vital mandibular molars. In addition, the bilateral presentation observed in one of the patients further illustrates the potential multifocal behavior of this uncommon lesion.

Conclusion

BBC is an uncommon inflammatory odontogenic cyst that should be considered in the differential diagnosis of radiolucent lesions associated with vital, fully or partially erupted mandibular molars in children and adolescents. Because its histopathological features are nonspecific, accurate diagnosis relies on careful clinicopathological correlation. The present cases, including a rare bilateral presentation involving mandibular second molars, reinforce the importance of recognizing the characteristic clinical and radiographic features of this entity.

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AUTHORS' CONTRIBUTIONS

B. T. G. Rodrigues, P.C. Silva, E.E.L.A. Foly: data collection and analysis, writing-review and editing. F.R. Pires and H.M. Silveira: data analysis and interpretation, writing—

original draft preparation; writing—review and editing. M.S. Israel and D.P.B. Ribeiro: data interpretation; writing—original draft preparation; writing—review and editing. All authors gave the final approval to the submitted version of the manuscript.

CONFLICT OF INTEREST STATEMENT

Funding: There are no financial conflicts of interest to disclose.
Competing interests: The authors declare no conflict of interest.

Ethics approval: Data from the patients here included were treated anonymously and a statement of informed consent was signed by all patients allowing the use of their dental records.

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Conflicts of Interest

The authors declare no conflict of interest.

Ethical approval

Data from the patients here included were treated anonymously and a statement of informed consent was signed by the patients allowing the use of their dental records.

Figure Legends

Figure 1. Case 1 – Bilateral buccal bifurcation cysts (BBC) in a young male patient. A, Extraoral examination reveals mild facial swelling on the right side (arrow). B, Intraoral examination shows no significant abnormalities, though a partially erupted mandibular right second molar is evident. C, Panoramic radiograph demonstrating bilateral radiolucent lesions in the mandibular molar regions. D-E, Enucleation performed under local anesthesia, exposing the cystic capsule in the buccal aspect of the right mandibular second molar. F, At the 1-year follow-up panoramic radiograph showing no evidence of recurrence and passive eruption of both mandibular second molars.

Figure 2. Case 2 – Buccal bifurcation cyst in a 13-year-old female patient. A, CBCT images demonstrate an extensive hypodense lesion in the buccal region of the mandibular right second molar, with buccal cortical expansion and resorption. B, Three-dimensional CBCT reconstruction showing mandibular osteolysis in the molar area. C,D Histopathological features of BBC: a cystic cavity lined by non-keratinized stratified squamous

epithelium exhibiting focal epithelial hyperplasia and a chronic inflammatory infiltrate (hematoxylin–eosin stain, original magnification ×100).