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Case report

Panoramic radiographic appearance suggestive of bilateral bifid mandibular condyles

Mohamed Adel Youssef Abdelsalam[1,*] and Ahmed Abd El-Latif Zeidan[2]

[1] Oral Radiology Department, Faculty of Oral and Dental Medicine, Badr University in Cairo, Cairo, Egypt
[2] Prosthodontics Department, Faculty of Oral and Dental Medicine, Badr University in Cairo, Cairo, Egypt

* **Correspondence:** Email: Mohamed.adel1@buc.edu.eg.

Abstract: Bifid mandibular condyle (BMC) is an uncommon anatomical variation of the mandibular condyle that is typically asymptomatic and often identified incidentally during routine radiographic evaluations. A 46-year-old male arrived at the outpatient dental clinic with a chief complaint of intermittent pain in the temporomandibular joint (TMJ) condyles for the past four months. The patient described the pain as a dull ache that worsened during mastication, yawning, or prolonged speaking. Panoramic radiography was performed as part of the routine assessment, revealing an unusual bifid bilateral mandibular condyles appearance. Bifid mandibular condyles, though often asymptomatic, may present with TMJ symptoms. Accurate diagnosis often depends on advanced imaging for thorough evaluation and effective management. Although Cone beam computed tomography (CBCT) was recommended in this case, the patient declined, which limited the assessment to panoramic radiography alone.

Keywords: bifid mandibular condyle (BMC); mandibular condyle anomalies; panoramic radiograph; temporomandibular joint

1. Introduction

Bifid mandibular condyles (BMC) are a rare anatomical anomaly of the temporomandibular joint (TMJ), characterized by a vertical cleft, notch, or depression in the condylar head, resulting in a

"double-headed" appearance, typically visible in the coronal plane during imaging [1]. Originally described by Hrdlička in 1941, BMC has been documented as a developmental, acquired, or idiopathic condition, with reported prevalence ranging widely from 0.3% to 5.84% across populations and imaging modalities [2]. While most cases are discovered incidentally during routine radiographic evaluations, such as orthopantomography (OPG), CBCT, or MRI, some patients may have TMJ-related symptoms, including joint pain, clicking, limited mouth opening, or joint deviation [3].

The etiology of BMCs remains uncertain and multifactorial. Proposed causes include developmental disturbances, mandibular trauma, perinatal injury, teratogenic exposures, endocrine or nutritional deficiencies, and previous surgical interventions such as condylectomy [4]. Although it usually affects a single condyle, bilateral presentations have been reported but remain exceedingly rare [5]. Clinically, the significance of BMCs lies in its potential association with TMJ dysfunctions or in being mistaken for pathological conditions such as condylar fractures or neoplasms. In symptomatic individuals, the altered condylar morphology may lead to remodeling of articular fossa or adjacent structures, potentially contributing to complications such as joint ankylosis, dislocation, or deviation on mandibular movement [2]. Therefore, an accurate understanding of the morphological characteristics of BMC, supported by radiographic and tomographic evaluation, is essential for appropriate diagnosis, management, and differentiation from more serious TMJ pathologies [3].

In this report, we present a case of bifid mandibular condyles detected in panoramic radiography during routine TMJ evaluation and discuss the diagnostic challenges, radiographic features, and clinical implications of this rare anomaly.

2. Case report

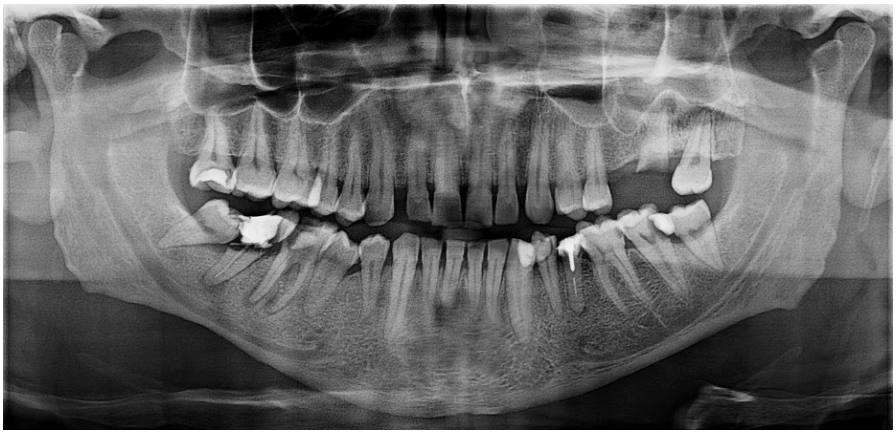

Figure 1. Panoramic radiograph illustrating bilateral bifid mandibular condyles, exhibiting the characteristic appearance of duplicated condylar heads.

A 46-year-old male arrived at the outpatient dental clinic with a chief complaint of intermittent pain in both TMJ regions for the past four months. The patient described the pain as a dull ache that worsened during mastication, yawning, or prolonged speaking. The patient denied any history of trauma, systemic illness, or recent dental procedures. On clinical examination, there was mild tenderness upon palpation of TMJ and limited mouth opening (maximum interincisal distance of 28 mm) with audible clicking. No deviation of the mandible was observed during opening or closing

movements. The patient was carefully evaluated for the presence of any additional developmental anomalies, and none were identified based on clinical examination and available radiographic findings. Panoramic radiography was performed as part of the routine assessment, which revealed an unusual bifid appearance of both mandibular condyles (Figure 1).

3. Discussion

The term ‘bifid’ originates from the Latin word ‘bifidus’, meaning split into two distinct parts. BMCs, also referred to as a double-headed condyle, represents a rare anatomical variation of the TMJ characterized by the duplication of the condylar head. The two articulating surfaces are separated by a distinct groove and may present in either a mediolateral or anteroposterior orientation [6].

Etiological factors have been proposed to contribute to the development of BMCs, including developmental disturbances, direct trauma to the condylar region, perinatal injuries, teratogenic influences during embryogenesis, and previous surgical interventions such as condylectomy [3].

In this case, the patient denied any history of trauma, systemic illness, or recent dental procedures. Therefore, the observed BMCs are likely of developmental origin, potentially resulting from a dysplastic alteration in condylar cartilage formation during early embryogenesis, possibly triggered by teratogenic factors. This assumption is supported by the findings of Szentpétery et al. [7], who suggested that mediolateral bifid condyles are typically associated with developmental anomalies. Clinically, BMCs may remain undiagnosed due to its asymptomatic nature. However, when symptoms are present, they may include TMJ pain, clicking, joint deviation, restricted mandibular movement, or ankylosis [8]. In this case, some signs or symptoms were noted: Pain as a dull ache that worsened during mastication, yawning, or prolonged speaking, and mild tenderness upon palpation of both TMJs, supporting the incidental nature of the diagnosis.

BMCs are most frequently identified incidentally during routine panoramic radiographic examinations. In this case, the mediolateral orientation of the bifid condyles facilitated their visualization on the panoramic radiograph. However, panoramic imaging is limited by factors such as magnification distortion and superimposition of anatomical structures, which may lead to misinterpretation of condylar orientation. To overcome these limitations, advanced imaging modalities, such as cone-beam computed tomography (CBCT), computed tomography (CT), and magnetic resonance imaging (MRI), are recommended for a more accurate assessment. Tomographic techniques are particularly advantageous in TMJ imaging, as they eliminate osseous superposition and provide detailed visualization of the bony architecture. Among these, MRI is considered the gold standard for TMJ evaluation due to its superior ability to depict soft tissue structures and the surrounding joint components [9].

CBCT is a highly advanced imaging modality that offers precise, high-resolution visualization of the osseous structures of the TMJ. However, in this case, the patient declined further imaging investigations, thereby limiting comprehensive radiographic assessment.

Management of symptomatic BMCs is typically conservative and aligns with standard protocols for TMJ pain dysfunction syndrome. Therapeutic approaches in this case commonly include the use of analgesics, nonsteroidal anti-inflammatory drugs (NSAIDs), muscle relaxants, physiotherapy, and occlusal splints aimed to alleviate pain and restore joint function. Unfortunately, long-term follow-up data were not available, as the patient did not return for subsequent visits. This has been acknowledged as a limitation in the case.

This case highlights the importance of thorough clinical and radiographic evaluation in patients with TMJ discomfort. Although BMCs are a rare anatomical variant and frequently asymptomatic, it can occasionally be associated with TMJ dysfunction or pain. Panoramic radiography remains a valuable initial diagnostic tool, but advanced imaging such as CBCT is recommended when panoramic findings suggest BMCs and further morphological characterization is required. Early identification and proper assessment of such anatomical anomalies can aid in guiding appropriate management and preventing potential complications.

Authors' contributions

Mohamed Adel Youssef Abdelsalam acquired the data, reviewed the literature and took part in manuscript writing and editing. Ahmed Abd El-Latif Zeidan took part in manuscript writing, designed the study, drafted the manuscript and provided final manuscript approval.

Data availability statement

Data supporting this research article is available from the corresponding author upon reasonable request.

Human rights statements and informed consent

The patient's informed consent was obtained for the use of radiographic images and clinical data.

Use of AI tools declaration

The authors declare they have not used Artificial Intelligence (AI) tools in the creation of this article.

Conflict of interest

The authors declare that there are no conflicts of interest.

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