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CASE REPORT:

Florid Cemento-Osseous Dysplasia of the Mandible: A Case Report with Magnetic Resonance Imaging Findings and Conservative Management

Displasia cemento-ósea florida de la nandíbula: Reporte de un caso con hallazgos en imagen por resonancia magnética y manejo conservador

Mustafa Kaan Samur[1] https://orcid.org/0009-0007-2489-3498
Melisa Öçbe[2] https://orcid.org/0000-0003-1609-610X

[1]Kocaeli Health and Technology University, Faculty of Dentistry, Kocaeli, Turkiye.
[2]DDS, PhD, Asst. Prof. Dr. Kocaeli Health and Technology University, Faculty of Dentistry, Department of Oral and Maxillofacial Radiology, Kocaeli, Turkiye.

Correspondence to: Mustafa Kaan Samur - m.kaansamur@gmail.com

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ABSTRACT: Florid cemento-osseous dysplasia (FCOD) is a benign fibro-osseous lesion that often affects multiple regions of the mandible and maxilla and is usually detected incidentally. Although it is frequently asymptomatic clinically, complications such as pain and infection may develop in some cases. This case report presents in detail a case of FCOD identified in a 51-year-old female patient who presented with pain in the left mandibular region. Panoramic radiographs taken at different times and magnetic resonance imaging (MRI) findings were used in the diagnostic process, and a definitive diagnosis was made based on clinical and radiological data. The patient was managed conservatively without the need for any invasive intervention. This case highlights the role of comprehensive imaging modalities in the differential diagnosis of florid cemento-osseous dysplasia and underscores the importance of conservative management strategies.

KEYWORDS: Florid cemento-osseous dysplasia; Fibro-osseous lesions; Magnetic resonance imaging.

RESUMEN: La displasia cemento-ósea florida (DCOF) es una lesión fibro-ósea benigna que a menudo afecta múltiples regiones de la mandíbula y el maxilar, y que generalmente se detecta de manera incidental. Aunque con frecuencia es clínicamente asintomática, en algunos casos pueden desarrollarse complicaciones como dolor e infección. Este reporte de caso presenta en detalle un caso de DCOF identificado en una paciente femenina de 51 años que acudió con dolor en la región mandibular izquierda. Para el proceso diagnóstico se utilizaron radiografías panorámicas tomadas en diferentes momentos y hallazgos de resonancia magnética (RM), y se estableció un diagnóstico definitivo con base en los datos clínicos y radiológicos. La paciente fue manejada de manera conservadora, sin necesidad de intervención invasiva. Este caso resalta el papel de las modalidades de imagen avanzadas en el diagnóstico diferencial de la displasia cemento-ósea florida y subraya la importancia de las estrategias de manejo conservador.

PALABRAS CLAVE: Displasia cemento-ósea florida; Lesiones fibro-óseas; Resonancia magnética.

INTRODUCTION

Florid cemento-osseous dysplasia (FCOD) is a benign fibro-osseous lesion that originates from the periodontal ligament and is characterized by multifocal radiopaque lesions predominantly affecting the mandible and, to a lesser extent, the maxilla (1). The lesion typically manifests bilaterally and symmetrically, often involving multiple quadrants of the jaws (2, 3). Epidemiologically, FCOD demonstrates a marked female predominance, particularly among individuals aged 30-60 years, and occurs more frequently in African and Asian populations (1-3). Radiographic surveys have reported prevalence rates ranging from approximately 0.4% to 4.5%, with florid forms representing the most extensive subtype within the cemento-osseous dysplasia spectrum (1-3). This tendency shows the importance of ethnic and gender-based screening in radiographic examinations within certain populations.

Clinically, FCOD is usually asymptomatic and is most often detected incidentally during routine dental radiographic examinations such as panoramic radiographs or periapical imaging (1, 2). However, in advanced stages or in the presence of secondary infections, the lesion may present with symptoms such as pain, localized swelling, suppuration, and in rare cases, secondary osteomyelitis (1, 4). These complications are particularly relevant when the sclerotic nature of the lesion impairs vascularity, thereby increasing susceptibility to infection and necrosis.

Radiographically, the progression of FCOD is marked by distinct stages. In the early phase, lesions appear as well-defined radiolucent zones adjacent to tooth roots. As the disease advances, internal mineralization increases, leading to a mixed radiolucent-radiopaque appearance. In the mature phase, the lesions become densely radiopaque, typically surrounded by a thin radiolucent halo, which reflects a narrow fibrous capsule or margin of less mineralized tissue (2, 5). These evolving radiographic patterns are crucial for accurate diagnosis and must be distinguished from other fibro-osseous lesions. Histologically, FCOD is characterized by a dense fibrous stroma interspersed with varying amounts of mineralized material resembling bone or cementum. These deposits are typically acellular or poorly cellular and are embedded within a collagen-rich matrix.

Diagnosis of FCOD relies on characteristic radiological findings supported by clinical correlation. Biopsy is generally unnecessary unless the presentation is atypical or malignancy is suspec-

ted (2, 5, 6). Advanced imaging, such as cone-beam computed tomography (CBCT) or magnetic resonance imaging (MRI), may provide additional insight into the lesion's extent and relation to adjacent structures. Differential diagnosis should include other fibro-osseous and inflammatory conditions such as ossifying fibroma, chronic osteomyelitis, and Paget's disease (1, 2). Unlike FCOD, ossifying fibroma is typically solitary and expansile, chronic osteomyelitis may present with systemic symptoms, and Paget's disease is usually associated with elevated serum alkaline phosphatase and affects multiple bones.

The present case report aims to highlight the clinical and radiological features of FCOD, with its diagnostic challenges, the importance of differential assessment, and the effectiveness of conservative management strategies.

CASE PRESENTATION

The present case involves a 51-year-old female patient who presented with complaints of pain localized in the left mandibular region. Her systemic medical history revealed no systemic diseases or genetic predispositions that could be associated with the development of FCOD. Intraoral examination revealed no visible swelling, mucosal lesion, or fistula formation in the affected region. However, palpation elicited localized tenderness. A panoramic radiograph taken at the time of presentation showed a well-defined lesion area in the left posterior mandible, characterized by heterogeneous radiopacities surrounded by a narrow radiolucent rim. When compared to a previous panoramic radiograph obtained approximately seven months earlier at another center, only minimal progression in lesion size was observed, suggesting a relatively stable course (Figure 1).

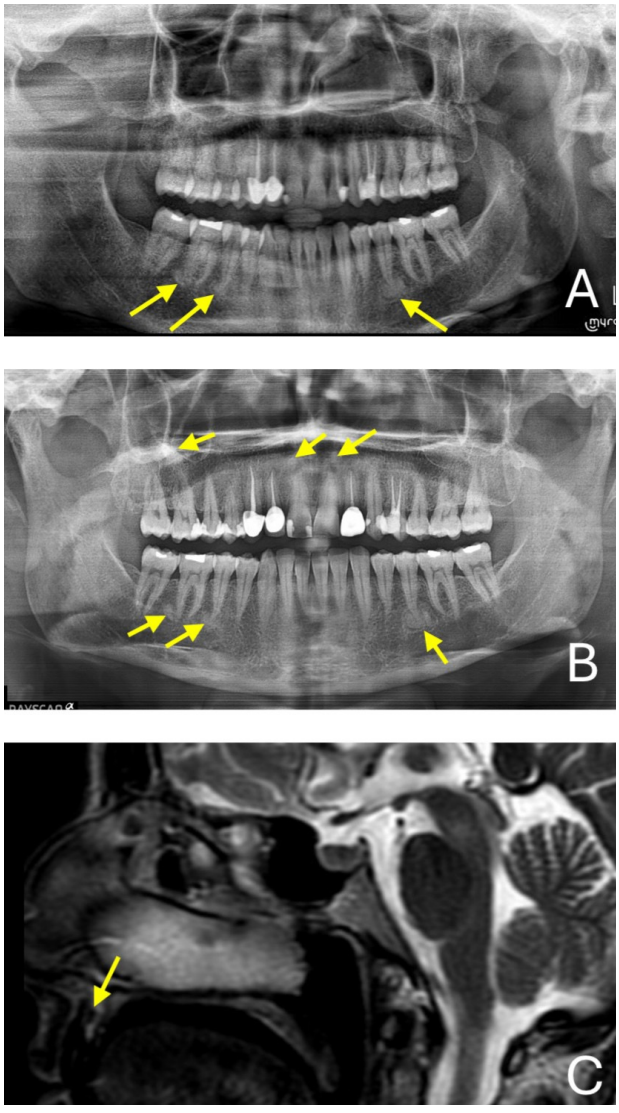

Figure 1. (A) Panoramic radiograph obtained seven months prior to the patient's presentation at our institution, demonstrating a well-circumscribed, mixed radiolucent-radiopaque lesion in the bilateral posterior mandible (arrows), consistent with the early-to-intermediate stage of cemento-osseous dysplasia. (B) Follow-up panoramic image taken at the time of presentation, revealing progression to a more radiopaque lesion with a sclerotic internal structure and a narrow peripheral radiolucent halo. Multifocal involvement of the mandible and maxilla is evident (arrows), consistent with the radiographic features of florid cemento-osseous dysplasia. (C) Sagittal section from magnetic resonance imaging (MRI) demonstrates a hypointense signal on T1-weighted sequences corresponding to the mineralized content of the lesion (arrow). No evidence of soft tissue invasion or mass effect is noted, further supporting the benign nature of the lesion.

The patient's previous imaging records were reviewed to assess potential changes in lesion size, degree of calcification, and maturation consistent with the natural progression of FCOD. During this evaluation, an MRI study that had been previously obtained at an external center was identified and re-examined. The MRI study was performed at an external radiology center using a 1.5-T system. The imaging protocol included axial and sagittal fast spin-echo (FSE) T1-weighted (TR/TE: 550/12 ms) and FSE T2-weighted (TR/TE: 4200/90 ms) sequences with a slice thickness of 3 mm and field of view (FOV) of 18 cm. Both sequences demonstrated a sharply marginated, hypointense lesion corresponding to areas of mature mineralization. No signal alteration in surrounding soft tissues or bone marrow was observed, and no enhancement suggesting infection, necrosis, or expansion was present. Diffusion-weighted imaging (DWI) and apparent diffusion coefficient (ADC) mapping were not included in the external protocol.Since the MRI sequences adequately demonstrated the extent and internal features of the lesion, no additional CBCT was performed to prevent unnecessary radiation exposure. The MRI findings revealed no evidence of infection, necrosis, or soft-tissue involvement. In addition, MR images revealed the lesion appeared as a hypointense area, consistent with the imaging characteristics of FCOD. MRI findings indicated that the lesion did not exert a significant mass effect, showed no invasion into surrounding soft tissues, and exhibited a low signal intensity, supporting its benign nature. Based on the radiographic and clinical findings, a provisional diagnosis of FCOD was made. The differential diagnosis included other fibro-osseous and inflammatory lesions such as ossifying fibroma. Although ossifying fibroma may present with a similar radiographic appearance, it typically demonstrates expansile growth-an important feature that was absent in the current case.

Given the mild symptoms, the lesion's stable behavior, and the absence of complications, no invasive intervention was recommended. Instead, a conservative management approach was adopted, with emphasis on regular radiological monitoring. The patient was informed about the importance of maintaining optimal oral hygiene and advised to remain vigilant for any signs of secondary infection. A structured follow-up plan including periodic clinical and radiological evaluations was established. The patient was evaluated clinically and radiographically at 6-month intervals during the first year and annually thereafter. Follow-up imaging included panoramic radiographs, with additional imaging considered only if new symptoms emerged. Clinical or radiological findings such as pain, swelling, suppuration, or evidence of lesion enlargement or cortical disruption were defined as criteria for modifying management. Over the follow-up period, no progression or complications were observed.

For this case presentation, written informed consent was obtained from the patient for clinical management and for the publication of anonymized clinical data and imaging findings. All procedures were conducted in accordance with the Declaration of Helsinki. The case illustrates the importance of correlating clinical findings with imaging studies in the diagnosis of FCOD and supports the effectiveness of a conservative, non-invasive management strategy in asymptomatic or minimally symptomatic cases.

DISCUSSION

FCOD is classified by the World Health Organization's 2022 classification as a benign fibro-osseous lesion, typically affecting middle-aged women and exhibiting multifocal, often asymptomatic behavior (4). These lesions most frequently appear bilaterally in the posterior mandible and are commonly discovered incidentally during routine dental imaging such as panoramic radiographs or periapical films (1, 2). However, in certain cases, they may become symptomatic due

to secondary triggers including infection, trauma, or prosthetic pressure, although such complications are rare.

In the presented case, the patient's main complaint was localized pain, with no signs of expansion or infection during clinical examination. This presentation was interpreted as an uncomplicated and early-detected symptomatic form of FCOD. Similar cases in the literature reveal the effectiveness of a conservative, observational approach in managing mild symptoms without complications (5-8). Radiographic findings are central to diagnosing FCOD. In early stages, lesions appear as radiolucent foci, later transitioning into a mixed radiolucent-radiopaque pattern, and ultimately becoming predominantly radiopaque with a narrow radiolucent border in the late stage. In our case, the lesion's well-defined borders, narrow radiolucent rim, and bilateral distribution strongly supported the diagnosis of FCOD (3,5). Differential diagnosis should consider other fibro-osseous or inflammatory conditions such as ossifying fibroma, chronic osteomyelitis, and Paget's disease. Ossifying fibroma is usually solitary, well-demarcated, and expansile, while chronic osteomyelitis often presents with inflammatory and systemic signs. The absence of systemic symptoms, expansion, and a stable clinical presentation in this case aided in ruling out these conditions (2, 5).

Treatment strategies should be guided by the clinical behavior of FCOD. Asymptomatic lesions typically require no intervention, whereas symptomatic cases should prioritize infection control and the avoidance of invasive procedures. Surgical interventions are generally reserved for cases with significant complications due to the associated risk of poor healing and secondary infection (5). In our patient, given the mild symptoms and radiographic stability, a conservative follow-up approach was adopted, including regular clinical and radiological monitoring, oral hygiene reinforcement, and infection prevention. The standard approach is conservative, involving periodic clinical and radiological follow-up, particularly to monitor lesion progression, rule out expansion, and detect potential secondary infections. Surgical excision or curettage is generally discouraged unless the lesion is associated with persistent symptoms, non-resolving infection, or functional or prosthetic impairment. When surgery is considered, meticulous planning is essential due to the risk of poor healing in sclerotic, poorly vascularized bone. Thus, the therapeutic decision must balance the potential benefits against the risks, with conservative monitoring remaining the preferred strategy for most asymptomatic or minimally symptomatic patients (4,5,10). The literature presents diverse clinical strategies. Kayaaltı Özarslan *et al*. reported a symptomatic 20 mm FCOD lesion in the posterior mandible treated successfully via surgical excision and contouring. Histopathology revealed cementum-like mineralized structures within a dense fibrous stroma, suggesting excision may be curative in select symptomatic cases (4, 9, 10). FCOD commonly presents a unique clinical and radiological profile that sets it apart from other fibro-osseous lesions of the jaws. Clinically, it is often asymptomatic and discovered incidentally during routine dental radiographs, though in some cases, it may cause mild discomfort, swelling, or secondary infection (10). When symptoms occur, they are typically localized and non-specific, such as mild pain or tenderness, particularly in response to trauma or prosthetic irritation. Radiologically, FCOD is characterized by multifocal, bilateral lesions-most frequently involving the posterior mandible. The lesions evolve through three stages: an initial radiolucent phase, a mixed radiolucent-radiopaque phase, and a mature radiopaque phase. In the mature stage, the sclerotic masses are often surrounded by a narrow radiolucent rim, reflecting their well-circumscribed but dense mineralized nature (1-3, 5, 11-14). The radiologic appearance of the lesion may significantly vary in cases complicated by FCOD-associated osteonecrosis, where

extensive bone resorption can be observed. Such cases often demonstrate irregular or ill-defined radiopaque masses with areas of sequestration, cortical disruption, and loss of the characteristic peripheral radiolucent rim. These radiographic changes can mimic chronic osteomyelitis or malignancy, complicating the diagnostic process. Therefore, in the presence of pain, swelling, or suspected infection, careful evaluation using advanced imaging modalities such as cone-beam CT or MRI may be warranted to assess the extent of necrosis and guide appropriate management. Recognizing these atypical features is essential to avoid misdiagnosis and unnecessary or aggressive surgical intervention.

The placement of dental implants in areas affected by FCOD remains a complex clinical challenge due to the altered bone metabolism, impaired vascularization, and increased risk of postoperative complications such as infection or osteonecrosis. FCOD is characterized by the progressive replacement of normal bone with dense, sclerotic, and poorly vascularized fibro-osseous tissue, which may compromise osseointegration and healing following implant placement. The systematic review by Li, Delgado-Ruiz, and Romanos (2024) provides valuable insights into long-term outcomes associated with implant-supported versus removable prosthetic rehabilitation in this patient population (11). According to Li et al., dental implants placed in FCOD-affected regions demonstrated a relatively high risk of early or late failure, particularly in cases where implant positioning intersected with mature, sclerotic areas of the lesion. The review, which included studies with a minimum follow-up period of three years, found that success rates were notably lower in FCOD patients compared to healthy controls, with peri-implant complications including mucositis, peri-implantitis, and late implant failure due to impaired osseointegration. Moreover, the dense nature of the dysplastic bone may lead to poor primary stability and difficulty during surgical drilling, potentially resulting in overheating, necrosis, or microfractures. Interestingly, the authors emphasized that implant outcomes were more favorable when placed in earlier, less mineralized stages of FCOD or in adjacent non-lesional bone. Cases in which careful preoperative planning, 3D imaging, and minimally invasive techniques were employed showed more predictable results. (11).

FCOD exhibits variability in presentation, ranging from small, focal lesions confined to a single quadrant (focal COD) to extensive, florid forms affecting all quadrants of the jaws. This variation has led to discussions around its classification as a spectrum rather than a distinct entity, with focal COD potentially representing an early or localized form of FCOD (2,12). A case followed by Öçbe *et al*. investigated the transformation of focal COD over a seven-year period. The lesion remained asymptomatic, and the associated tooth retained vitality throughout. Radiological findings showed a gradual increase in internal hyperdense content and minimal expansion, underscoring the value of long-term monitoring (12). Although CBCT remains the gold standard in dental radiology for the evaluation of osseous structures due to its high spatial resolution and low radiation dose, MRI provides complementary diagnostic information, particularly regarding lesion composition and potential soft-tissue involvement. The ability of MRI to differentiate mineralized, fibrous, and inflammatory components without radiation exposure is advantageous in cases where soft-tissue invasion or osteomyelitis is suspected. In this case, fast spin-echo T1- and T2-weighted sequences demonstrated hypointense signals, confirming the sclerotic and mineralized nature of the lesion, consistent with mature-stage FCOD. However, MRI's limitations include lower accessibility in dental settings, reduced sensitivity for cortical detail, and, in our case, the absence of diffusion-weighted imaging and ADC quantifica-

tion. Despite these limitations, MRI findings provided sufficient information to confirm lesion stability and to avoid unnecessary additional radiation exposure from CBCT.

This report has several limitations. Histopathological confirmation was not obtained, as the diagnosis was established based on characteristic clinical and radiographic findings, and biopsy was avoided to prevent unnecessary surgical trauma. Similarly, metabolic and hormonal tests, such as serum alkaline phosphatase measurement, were not performed since the patient showed no systemic or radiological features indicative of metabolic bone disease. The follow-up period was relatively short; therefore, continued long-term monitoring is recommended to ensure lesion stability and to detect possible secondary complications. Despite these limitations, the radiographic and clinical findings were highly consistent with the diagnosis of FCOD.

In conclusion, FCOD is a benign lesion that typically follows an asymptomatic course but may occasionally become symptomatic. It is diagnostically distinctive yet requires careful clinical judgment for appropriate management. This case shows that identification based on clinical and radiological findings plays an important role in avoiding unnecessary invasive procedures and selecting the most appropriate treatment approach. In cases with mild symptoms and stable radiographic findings, conservative monitoring proves to be a safe and effective method. Multidisciplinary evaluation and regular follow-up remain essential elements in patient-centered care for FCOD.

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