Int J Clin Exp Med 2017;10(6):9664-9668
www.ijcem.com /ISSN:1940-5901/IJCEM0051888

*Case Report*

# Epithelioid osteoblastoma in the periapical region of maxillary molars: a rare case report

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Received December 26, 2016; Accepted May 13, 2017; Epub June 15, 2017; Published June 30, 2017

**Abstract:** Osteoblastoma is a rare benign bone-forming neoplasm which rarely affects the jaws. Due to the rarity and wide range of clinical, radiographic, and histopathological findings, the diagnosis of gnathic osteoblastoma can be challenging. The authors report here an unusual case of osteoblastoma in the periapical region of maxillary molars. An 18-year-old woman presented with pain and swelling of the right maxillary posterior region. Computed tomography scan revealed awell-circumscribed periapical radiolucency with scattered radiopaque foci above the maxillary right first and second molars. Mucosal thickening of the right maxillary sinus was observed. The presence of teeth with pulp vitality excluded the possibility of apical periodontitis, and the intact corticated floor of the sinus also implied a sinusitis of nonodontogenic origin. The radiographic findings and the location of the lesion suggested the possibility of odontogenic cyst or tumor. Permanent histology and immunohistochemical studies revealed an epithelioid osteoblastoma. This case highlights the importance of considering osteoblastoma in the differential diagnosis of periapical lesions of vital teeth, especially with a mixed radiolucent and radiopaque appearance. Definite diagnosis depends on histopathological examination.

**Keywords:** Osteoblastoma, epithelioid osteoblastoma, periapical diseases, maxilla

## Introduction

Osteoblastoma is a rare benign bone-forming neoplasm accounting for less than 1% of primary bone tumors. It is most commonly found in the vertebral column and long bones [1]. Osteoblastoma of the jawbones is uncommon, and the mandible is affected 2-3 times more frequently than the maxilla [1-3]. Radiographic findings are variable, ranging from radiolucent to mixed or radiopaque, with ill- to well-defined borders. Due to the rarity and non-specific manifestation of osteoblastoma, diagnosis can be challenging. Histological examination is crucial for the definite diagnosis. Histologically osteoblastoma is a benign, vascular, osteoblastic tumor with variable osteoid mineralization andabsent mitotic activity or atypia [1-3]. Various histological variants, including aggressive osteoblastoma, epithelioid osteoblastoma, and pseudoanaplastic osteoblastoma, have been described. Epithelioid osteoblastoma is a rare variant of osteoblastoma distinguished histologically by the numerous epithelioid osteoblasts [4-6]. Similar cases have also been described under the designation aggressive osteoblastoma [7, 8]. Herein, we report an unusual case of epithelioid osteoblastoma in the periapical region of maxillary molars of an 18-year-old woman.

## Case report

An 18-year-old woman presented with pain and swelling of the right maxillary posterior region. The patient reported a history of intermittent pain in this region for one year, and the pain recently became more intense which was not relieved by analgesics. A panoramic radiograph performed in local dental clinic in her hometown displayed a well-circumscribed unilocular radiolucency of about 1 cm in diameter at the apex of right maxillary molars. The patient then went to our hospital for further treatment. On physical examination, there were no extraoral findings or lymphadenopathy. Intraorally, there

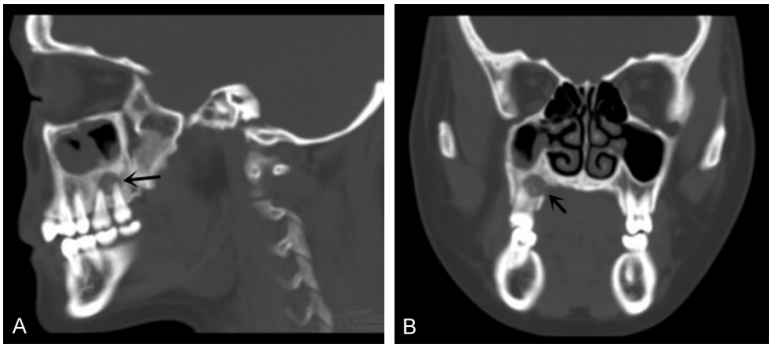


**Figure 1.** A. Sagittal CT image demonstrating a well-defined periapical radiolucency (arrow) with small radiopaque foci above the maxillary right first and second molars. B. Coronal CT image showing slight resorption of the palatal cortical bone (arrow).

was a bony-hard swelling with well-defined borders on the palatal side of maxillary right first and second molars with no erythema, edema, or drainage. There was no mobility in any of the teeth, which were reactive to vitality testing, showing no local periodontal disease. The medical and family histories were unremarkable. Her chest X-ray was normal and all laboratory values were within normal limits. Computed tomography (CT) scan of the jaw revealed a well-circumscribed periapical radiolucency of 10.6 × 9.5 mm in size above the maxillary right first and second molars (**Figure 1A**). Small radiopaque foci were observed inside the area, as well as slight resorption of the palatal cortical bone (**Figure 1B**). Mucosal thickening of the right maxillary sinus implied maxillary sinusitis, and the corticated floor of the sinus remained intact. Surgical curettage of maxillary lesion and sinus was performed.

Histological examination of the maxillary surgical specimens revealed a proliferation of large epithelioid cells that were producing densely calcified osteoid within a vascularized fibrous stroma (**Figure 2A**). The epithelioid cells had abundant eosinophilic cytoplasm with a perinuclear clearing and eccentrically situated nuclei containing prominent nucleoli (**Figure 2B**). Mitoses were rare and no atypical figures were found. Scattered osteoclast-like giant cells were seen. Immunohistochemically, the tumor cells were positive for epithelial membrane antigen (**Figure 3A**) and vimentin (**Figure 3B**), but negative for pan-cytokeratin, CK5/6, CK7, p63, S100, CD68 (**Figure 3C**), smooth muscle actin, leucocyte common antigen, desmin, myogenin, MyoD1 and HMB45. The Ki-67 labeling index was approximately 3%. A diagnosis of epithelioid osteoblastoma was made. The maxillary sinus mucosa specimen showed a non-specific chronic inflammation with infiltration of lymphocytes and plasma cells. Postoperative recovery was uneventful and the patient was well without any sign of recurrence 3 years after surgery.

## Discussion

Osteoblastoma of the jaws is rare, and only around 140 cases have been reported in the literature [3]. The average age is 23 years (range 3-78 years), with a 1.1:1 female-to-male ratio and 72% involving the mandible. The clinical presentation is varied. Most patients present with swelling accompanied by pain, tenderness, or discomfort, but some are asymptomatic [1-3]. Radiographically, osteoblastoma usually presents as a well-delimited, mixed radiopaque and radiolucent lesion. Depending on the extent of intralesional mineralization, the lesion can present predominantly as a radiolucent or radiopaque image [1-3].

The clinical and radiographic features of osteoblastomas are non-specific, often causing difficulties in establishing the diagnosis. In the present reported case, the clinical history reported was swelling and pain, associated with the right maxillary molars. Radiographically, the present case exhibited a well-defined radiolucency with small radiopaque foci. Symptomatology in the molar periapical region at the time of the first examination suggested an apical periodontitis lesion. Moreover, radiographic examination revealed mucosal thickening of the right maxillary sinus, which also implied maxillary sinusitis of odontogenic origin. However, a careful clinical examination showed tooth vitality, eliminating the possibility of apical periodontitis. In addition, the corticated floor of the maxillary sinus was intact, suggesting a sinusitis of nonodontogenic origin. These radiographic findings and the location of the maxillary lesion suggested the possibility of benign odontogenic tumor, such as calcifying epithelial odontogenic tumor, adenomatoid

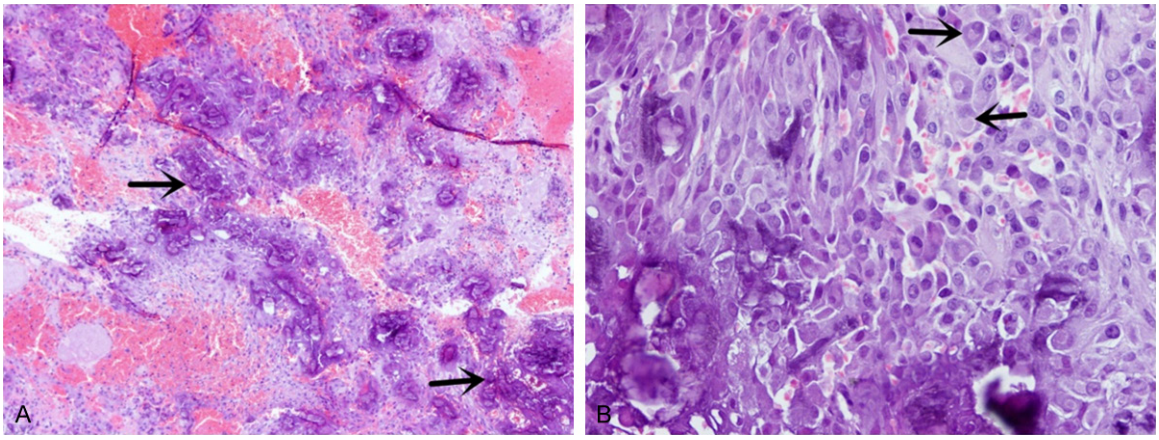


**Figure 2.** A. Histological examination reveals bland, large, epithelioid osteoblasts with scattered calcifications (arrow) within a fibrovascular stroma (HE × 100). B. High magnification shows epithelioid osteoblasts with cytoplasmic clearing and eccentric nuclei (arrow) (HE × 400).

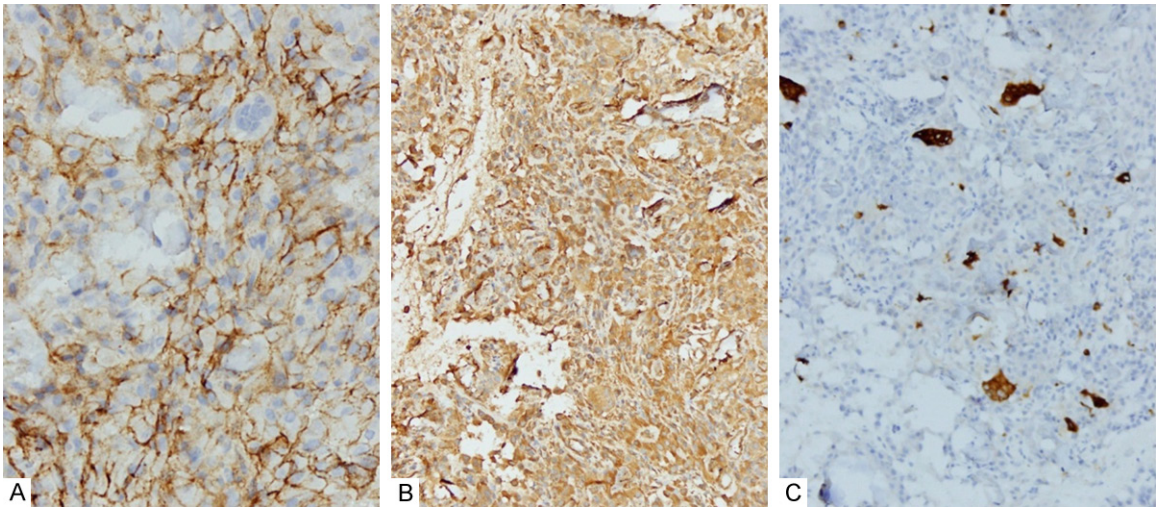


**Figure 3.** A. The neoplastic epithelioid cells show positivity for epithelial membrane antigen (× 400). B. The tumor cells are diffusely immunoreactivity for vimentin (× 200). C. Scattered osteoclast-like giant cells show immunoreactivity for CD68 (× 200).

odontogenic tumor or calcifying cystic odontogenic tumor. However, the final histopathological report confirmed the diagnosis of osteoblastoma with epithelioid morphology, namely, epithelioid osteoblastoma.

Histologically, osteoblastoma is characterized by interconnecting trabeculae of woven bone and rimmed by prominent osteoblasts. The neoplastic osteoblasts are oval to round, have eosinophilic cytoplasm and eccentrically located uniform dark staining nuclei. The intertrabecular space is filled with richly vascular loose connective tissue that often contains foci of extravagated red blood cells. Mitoses are inconspicuous, and necrosis is usually not present. Conventional osteoblastoma is well delineated and does not permeate the surrounding bone [1-3]. The hallmark histologic feature of epithelioid osteoblastoma is the presence of plump epithelioid osteoblasts arranged in large sheets encompassing intertrabecular spaces as well as lining the periphery of lesional bony trabeculae. The epithelioid osteoblasts typically have a plasmacytoid appearance with abundant eosinophilic cytoplasm, well-defined cell borders, and eccentric round to oval nuclei with occasional nucleoli. The presence of these epithelioid osteoblasts is the primary criterion utilized to distinguish conven-

tional osteoblastoma from epithelioid osteoblastoma [4, 5]. Currently, immunohistochemistry has a limited role in diagnosing osteoblastoma, as this tumor type is largely identified by its morphologic features.

Aggressive osteoblastoma is another rare variant of osteoblastoma, which was first described in 1984 by Dorfman and Weiss [9]. Clinically, aggressive osteoblastomas demonstrate rapid growth and are locally destructive, and present as expansile osteolytic lesions with focal radiopacity. Aggressive osteoblastoma often comprises large epithelioid osteoblasts histologically. Therefore, aggressive osteoblastoma is also referred to as epithelioid osteoblastoma in the literature [6-8]. Unfortunately, there is confusion regarding such terminology in the literature, with some authors describing lesions with truly aggressive clinical behavior and others describing lesions with merely epithelioid histomorphology. The presence of epithelioid osteoblasts alone is not a reliable predictor of aggressive clinical behavior. In a study of 306 osteoblastomas, Lucas et al [10] found no difference in clinical aggressiveness between epithelioid and conventional osteoblastoma. Analysis of an additional 55 cases for features typical of aggressive osteoblastoma, including epithelioid osteoblasts, lacelike osteoid, and a permeative growth pattern, also found no predictive value for any of the histologic features [11]. Therefore, size > 4 cm and an anatomic location that makes complete removal difficult may be of greater importance than histomorphology in predicting aggressive behavior [3].

Differentiating between an osteoblastoma and a low-grade osteosarcoma is most important. Tumor infiltration and entrapment of host bone indicates a more ominous pathologic process and is suggestive of low-grade osteosarcoma. While mild cellular pleomorphism and a low mitotic rate (less that 4 mitotic figures for 20 high-power fields) are acceptable findings in epithelioid osteoblastoma, the presence of atypical mitotic figures and/or chondroid differentiation (features of osteosarcoma) are absent in epithelioid osteoblastoma and favor the diagnosis of low-grade osteosarcoma [5-9].

Occasionally, the epithelioid osteoblastoma may mimic a calcifying epithelial odontogenic tumor, due to the presence of matrix deposits surrounded by large aggregates of epithelioid osteoblasts [12]. In doubtful cases, immunohistochemistry will solve the diagnostic problem by demonstrating the expression of epithelial markers in calcifying epithelial odontogenic tumor. Moreover, the matrix in the calcifying epithelial odontogenic tumor stains positive for amyloid with Congo Red whereas in osteoblastoma, it is of collagenous nature. The present case showed diffuse positivity for both EMA and vimentin, but negativity for pan-cytokeratin, CK5/6, CK7 and p63.

## Conclusion

Due to the rarity and wide range of clinical, radiographic, and histopathological findings, the diagnosis of gnathic osteoblastoma can be challenging. This case highlights the importance of considering this clinical entity in the differential diagnosis of periapical lesions of vital teeth, especially with a mixed radiolucent and radiopaque appearance. Definite diagnosis depends on histopathological examination. This case gives a clear clinical, radiological, and histopathological picture of maxillary epithelioid osteoblastoma, and might help with its diagnosis in future.

## Disclosure of conflict of interest

None.

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