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Case Challenge
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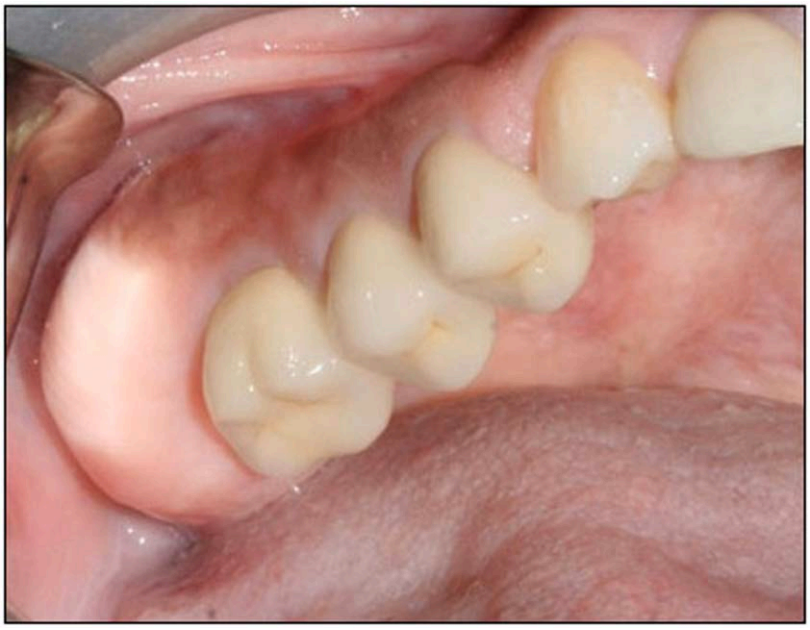
# A Mass of the Maxillary Tuberosity

James T. Castle, DDS, MS



The following Case Challenge is provided in conjunction with the American Academy of Oral and Maxillofacial Pathology.

## Case Summary

A 48-year-old African-American female was evaluated for an asymptomatic bony expansion of the right maxillary tuberosity.

After you have finished reviewing the available diagnostic information, make the diagnosis.

## Diagnostic Information

### History of Present Illness
The patient presented for a routine dental examination whereupon a bony expansion of the right maxillary tuberosity was noted. The patient was asymptomatic and could not recall how long it had been present.

### Medical and Dental History
The patient had a history of seasonal allergies and was taking vitamin supplements for anemia, but was not taking any other medications, nor was she under care for any other systemic conditions. The dental history, though not extensive, included a history of extraction in the area of concern.

### Clinical Findings
Clinical examination revealed a large, bony hard expansion of the right posterior maxilla that measured approximately 4.0 cm × 3.0 cm × 1.5 cm and extended slightly into the maxillary vestibule (Figure 1). The mucosa was of normal coloration with no areas of ulceration or alteration. The remainder of the oral cavity was without obvious disease and did not reveal masses such as that seen in the right posterior maxilla.

### Radiographic Findings
A panoramic radiograph (Figure 2) revealed a fairly well-circumscribed mass of the right posterior maxilla encompassing the posterior alveolar crest and the maxillary tuberosity. The lesion displayed a variable degree of radiodensity. The central portion of the mass exhibited a prominent radiodensity that, at its periphery, blended into the outer margins of the lesion producing a mixed radiodense pattern.

### Surgical Findings
Upon flap reflection, an exophytic expansion of bone with a broad base was encountered visually. The lesional tissue appeared to be demarcated from the surrounding bone, and easily separated from the bone upon surgical manipulation (Figure 3).

### Incisional Biopsy Findings
On incisional biopsy, a thin rim of cortical bone was present peripherally (Figure 4).

The lesional tissue consisted of rounded islands and trabeculae of bone within a highly cellular stroma of spindled to plump cells (Figure 5). Areas of cementum-like product were seen in addition to the bony product (Figure 6).

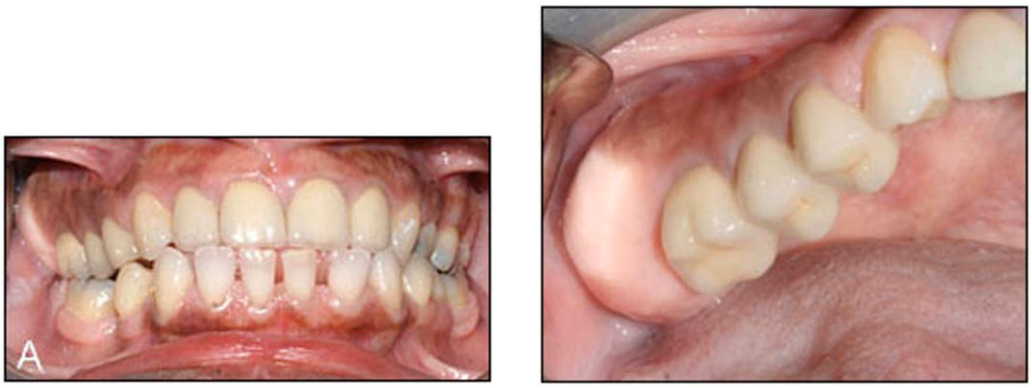



**Figure 1. A.** An expansile mass of the right posterior maxilla. **B.** Note the extension of the lesion beginning to involve the maxillary vestibule.

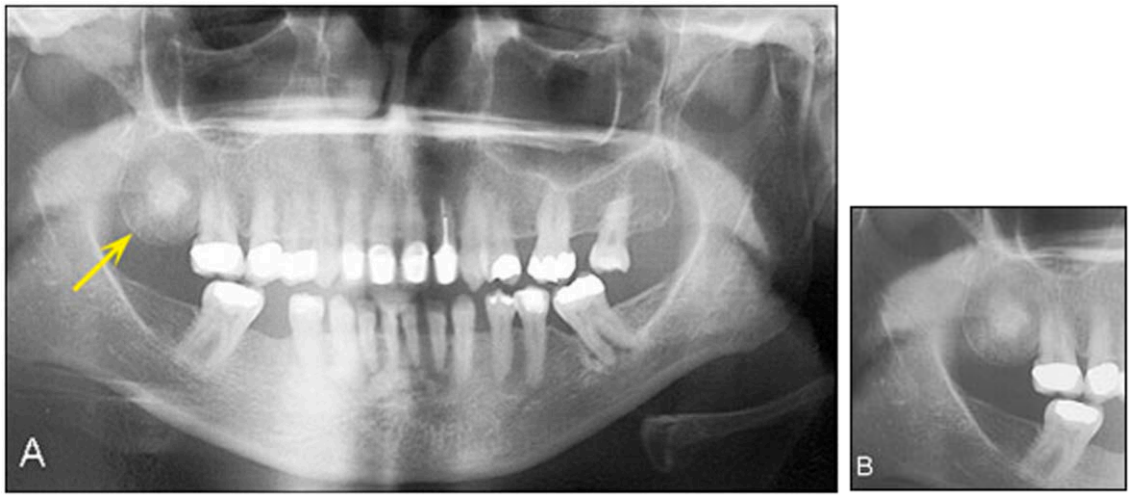



**Figure 2. A.** Panoramic radiograph depicting a well-defined mixed density with a central area of increased opacification. **B.** Close-up view of the lesion.

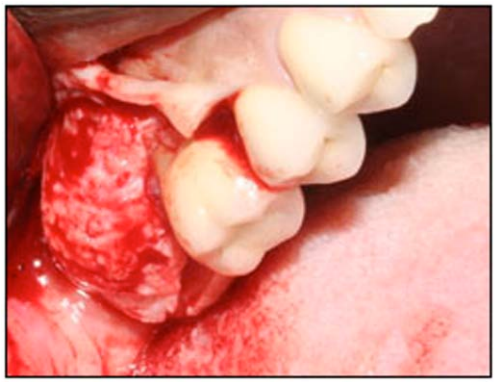


**Figure 3.** Flap reflection reveals a broad-based expansion of bone that was demarcated from the surrounding bone upon surgical incison.

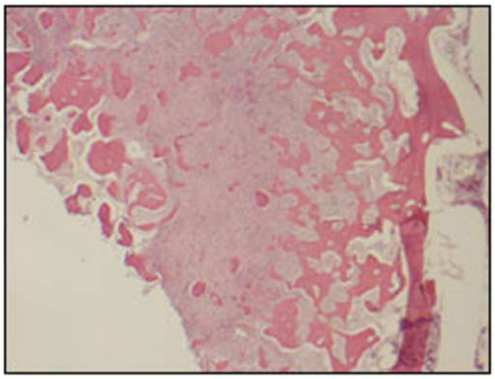
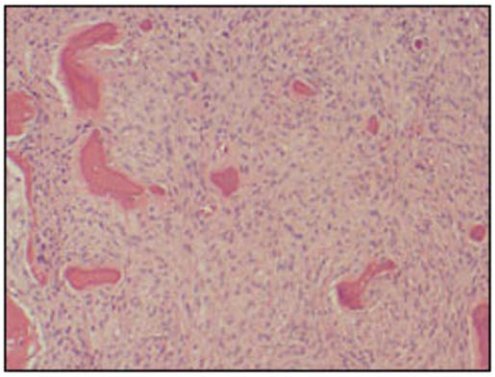


**Figure 4.** A low-power (200x) photomicrograph showing a thin rim of cortical bone surrounding bony islands and single bony trabeculae.



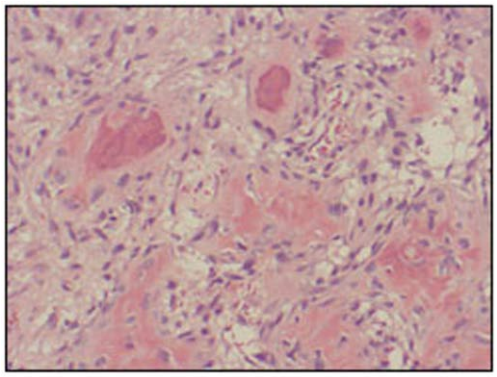
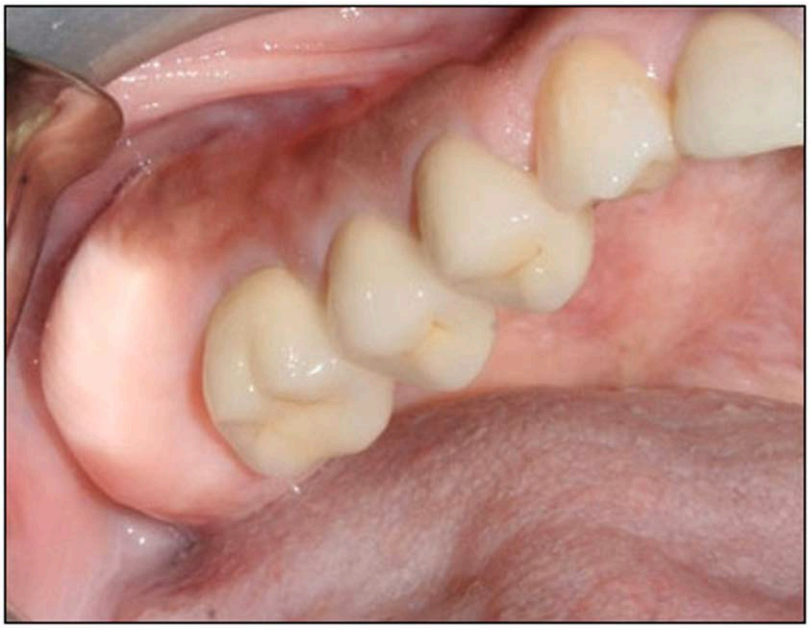


**Figure 5 and 6.** The highly cellular and storiform stroma contains islands of intermixed bony and cementum-like calcifications that have a thin, fibrillar border. (Figure 5: 200x magnification; Figure 6: 400x magnification.)

## Can you make the diagnosis?

A 48-year-old African-American female was evaluated for an asymptomatic bony expansion of the right maxillary tuberosity.



### Select the Correct Diagnosis

A. Focal Cemento-osseous Dysplasia
B. Fibrous Dysplasia
C. Ossifying Fibroma
D. Osteoma

## Focal Cemento-osseous Dysplasia

### Choice A. Sorry, this is not the correct diagnosis.

Radiographically, focal cemento-osseous dysplasia, in most cases, is a smaller lesion occurring overwhelmingly in the mandible in close proximity to the apices of teeth. The border of the lesion is usually somewhat ill-defined, although occasional areas of cortication may be seen.

The histology of focal cemento-osseous dysplasia is described as anastomosing, thick, curvilinear, acellular, bony trabeculae resembling “ginger roots” with basophilic outlines, often interspersed with free hemorrhage. These features are largely absent in the biopsy material in this case. Surgical intervention is not necessary in most cases for an accurate diagnosis of focal cemento-osseous dysplasia.

Please re-evaluate the information about this case.

## Fibrous Dysplasia

### Choice B. Sorry, this is not the correct diagnosis.

Fibrous dysplasia can affect single or multiple bones of the skull in addition to involving the axial skeleton. Peak incidence is in the second and third decades. The radiographic image displays an ill-defined, radiodense lesion with blended borders often described as “ground glass” or having “orange peel” characteristics. Microscopically, spicules of woven bone, described as resembling Chinese characters, are contained within a moderately cellular fibrovascular stroma. Surgical enucleation is made difficult due to the imperceptible clinical blending of the lesion with the surrounding bone. The age, radiographic presentation, histologic features, and surgical findings therefore argue against this diagnosis.

Please re-evaluate the information about this case.

## Ossifying Fibroma

### Choice C. Congratulations! You are correct.

The designation "benign fibro-osseous lesion" is an all-encompassing term that refers to a diverse group of pathologic processes in which the normal bone architecture is replaced by fibroblasts and collagen fibers with variable amounts of mineralized material.[1] The benign fibro-osseous lesions of the jaws include fibrous dysplasia, florid cemento-osseous dysplasia, periapical cemental dysplasia, focal cemento-osseous dysplasia, Paget's disease, and ossifying fibroma, among others. Ossifying fibroma, often also referred to as cemento-ossifying fibroma, is the most often encountered neoplasm of the jaws included in this category.[2,3]

The vast majority of cases of ossifying fibroma are encountered in women (88%),[4] with most occurring in the third to fourth decade of life.[5] The racial statistics show that Caucasians outnumber Black patients nearly 3:1, with 71% of cases located within the posterior mandible.[4] Clinically, ossifying fibroma presents as a painless neoplasm in which the slow, progressive growth is almost imperceptible to the patient. Diagnosis is often delayed until the lesion reaches such size as to cause obvious deformity recognized by the patient or an acquaintance, and prompting a radiographic survey. Occasionally, as seen in this case, the neoplasm may be incidentally identified on a routine screening radiograph.

Juvenile (active) ossifying fibroma, considered by some to be a subset of ossifying fibroma, typically presents as a very rapidly enlarging asymptomatic growth that may involve the jaws and/or facial bones, and can reach massive size. It typically affects children and teenagers. While the histopathologic features are somewhat similar to that seen in ossifying fibroma, the aggressive clinical course combined with certain distinctive histopathologic features would seem to warrant its classification as a distinctive fibro-osseous process separate from ossifying fibroma.[6]

The radiographic features of ossifying fibroma will vary depending on the stage at which the lesion is initially discovered. Early lesions usually present as small, entirely radiolucent areas. As the lesion matures, an increased radiopaque component is encountered, producing mixed density lesions.[7] Long-duration lesions may present as a primarily radiopaque mass with a thin radiolucent halo. A defined lesion without a sclerotic border was found in 40% of cases, whereas a well-defined radiographic lesion with a sclerotic border was noted in 21% of cases.[5] Surgical findings describe the lesion as an avascular, well-circumscribed mass of tissue that is enucleated with ease as either a single intact specimen or large surgically dissected fragments, as seen in this case.[3,4] The cut surface of the tumorous tissue reveals a homogenous consistency.[4] Complete enucleation is the recommended treatment.

Distinction between ossifying fibroma and the other fibro-osseous lesions of the jaws can be confounding, especially if a diagnosis is based on histologic parameters alone. The hard-tissue products have been shown to vary even within a single lesion. Woven, lamellar, or curvilinear trabeculae of bone; spheroid deposits resembling cementum; and/or dense foci of hard tissue may all be seen.[8] It is of paramount importance to have available all clinical and demographic information, as well as appropriate radiographic images, in order to arrive at an accurate diagnosis. As stated by Waldron, "in the absence of good clinical and radiologic information a pathologist can only state that a given biopsy is consistent with a fibro-osseous lesion."[2]

## Osteoma

### Choice D. Sorry, this is not the correct diagnosis.

Osteomas are composed of mature lamellar bone with scant fibrovascular spaces. The histopathologic features in this case are a strong argument against this diagnosis. Osteomas may be central or, more often, peripherally located. Singular specimens are rare, and multiple jaw osteomas may herald Gardner syndrome. Radiographs may reveal a quite dense, well-circumscribed lesion, which also has been described as pedunculated when in a peripheral location.

Please re-evaluate the information about this case.

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## About the Author

*Note: Bio information was provided at the time the case challenge was developed.*


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