

## **Bilateral Multi-locular Radiolucent Lesions of the Mandible**

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

### **Case Summary**

An 11-year-old boy returned for a regular follow-up examination because he was noted to have bilateral radiolucent areas in the ascending rami of the mandible.

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

## Diagnostic Information

### History of Present Illness

The patient had initially presented to his pediatric dentist for a routine exam three years previously. On radiographic examination, the pediatric dentist noticed areas of somewhat diffuse radiolucency bilaterally in the ascending rami of the mandible.

The lesion in the right ramus was more clearly visualized than the lesion in the left ramus. The pediatric dentist referred the patient to an oral and maxillofacial surgeon for evaluation and management. The oral surgeon made a provisional clinical diagnosis, and the patient was placed on recall to observe his development and monitor the areas of concern with serial panoramic radiographs. The patient was seen periodically over the subsequent three years.

### Medical History

The past medical history was unremarkable. A review of systems revealed no other abnormalities.

### Family History

No family history of similar problems was found in either parent. Siblings did not appear to be affected.

### Clinical Findings

Recently, there appeared to have been some enlargement of the soft tissues overlying the posterior mandible, producing “chubby cheeks.”

### Radiographic Findings

The initial radiographic survey from three years earlier is seen in Figure 1.

The lucent area in the right mandibular ramus was clearly visualized with a multilocular appearance. The lesion in the left ramus was somewhat diffuse and more difficult to localize.

Follow-up three months later (Figure 2) demonstrated the lesions to be fairly stable with perhaps slight enlargement of the lesion on the right.

Six months later (Figure 3) the lesion on the right side appeared stable, but the lesion in the left ramus area was now becoming more clearly defined with a multilocular pattern.

Eleven months later (1 year and 8 months after initial presentation) both lesions appeared to have enlarged (Figure 4). The lesion on the left side was now larger than the right and had begun to produce expansion of the anterior border of the ascending ramus and had extended into the coronoid process.

Additional follow-up eight months later (2 years 4 months from initial presentation) demonstrated further enlargement of the lesion on the right side with what was interpreted to be early extension into the coronoid region (Figure 5).

The current radiograph (Figure 6), three years from first discovery, showed continued enlargement with



**Figure 1.** An ulcerated red nodule on the right posterior hard palate.



**Figure 2.** Panoramic radiograph taken three months following Figure 1 in March 2005.



**Figure 3.** Panoramic radiograph taken in September 2005.

an almost bilaterally symmetrical appearance to the lesions.

#### **Surgical Findings**

At surgery, expansion of the cortices of the ascending rami was noted bilaterally. Tissue removed for biopsy was fibrous to gelatinous in its texture but somewhat friable and contained a speckled, whitish material.

#### **Biopsy Findings**

Microscopic examination revealed fragmented specimens composed predominantly of soft tissue. Small spicules of vital bone were scattered within the tissue and likely represented

the speckled white material seen at surgery. The soft tissue consisted of a background stroma of proliferating spindle-shaped fibroblastic appearing cells (Figure 7).

Embedded within the stroma, scattered multinucleated giant cells were appreciated (Figures 7 and 8).

The giant cells were seen multifocally rather than evenly dispersed throughout the background stroma. Of particular note, blood vessels within the stroma showed a prominent condensation and hyalinization of the peripheral collagen (Figure 9).



**Figure 4.** Panoramic radiographic taken in August 2006.

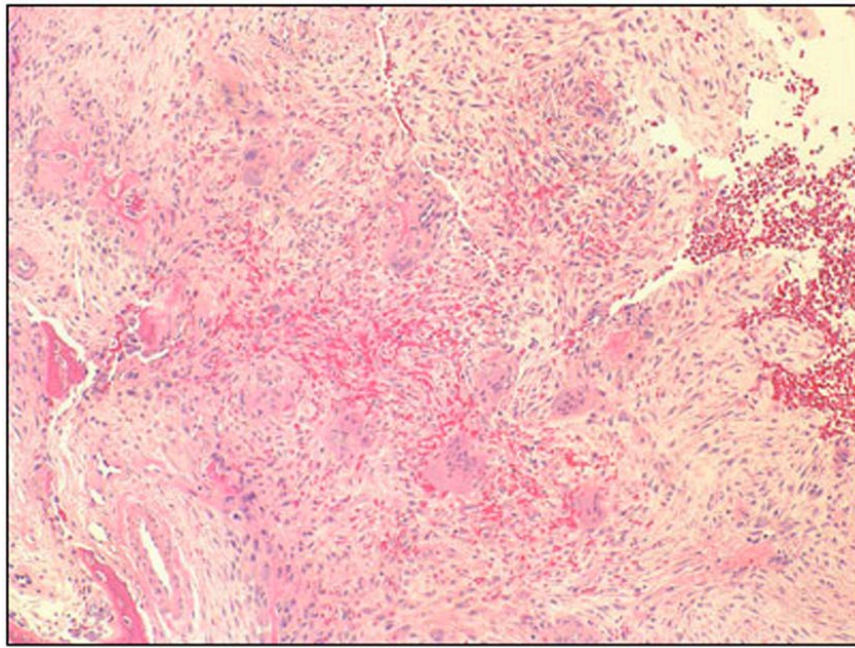


**Figure 5.** Panoramic radiograph taken in April 2007.

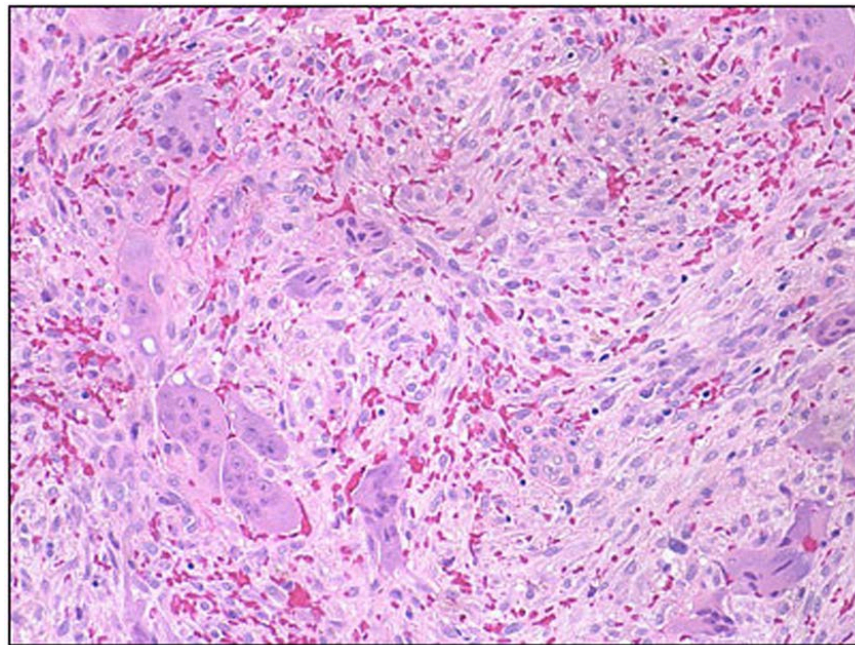


**Figure 6.** Panoramic radiograph demonstrating bilateral multilocular lesions involving the body, angle, and ramus areas of the mandible at the most recent evaluation of the patient in December 2007.

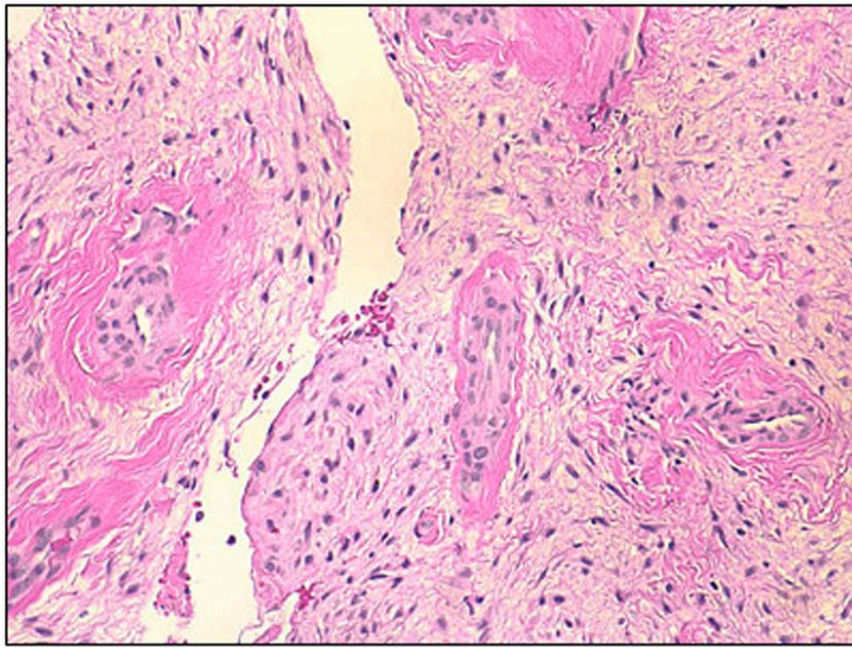




**Figure 7.** Histologic features demonstrating fibrous connective tissue stroma with proliferating spindle-shaped cells and focal aggregates of multinucleated giant cells (10x).



**Figure 8.** Histologic features demonstrating focal aggregates of multinucleated giant cells (20x).



**Figure 9.** Histologic features demonstrating perivascular eosinophilic condensation and hyalinization (20x).

### Can you make the diagnosis?

An 11-year-old boy returned for a regular follow-up examination because he was noted to have bilateral radiolucent areas in the ascending rami of the mandible.



### Select the Correct Diagnosis

- A. Brown Tumors of Hyperparathyroidis
- B. Multiple Odontogenic Keratocyst
- C. Cherubism
- D. Multiple Simple/traumatic Bone Cysts

## Brown Tumors of Hyperparathyroidis

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

Brown tumors of hyperparathyroidism are always a consideration when multiple radiolucent lesions involving the jaws are encountered.<sup>1,2</sup> While the radiographic lesions produced by the disease usually present as unilocular radiolucenct areas, a multilocular pattern may also be seen. Cortical expansion associated with the lesions is sometimes reported. The histopathologic features seen in this case, with the presence of multinucleated giant cells in a background spindle cell stroma, is certainly reminiscent of the histopathologic findings in brown tumors as well. However, brown tumors are always associated with hyperparathyroidism.<sup>3,4</sup> They are produced by the disruption of normal calcium and phosphate metabolism subsequent to the metabolic disease. Overproduction of parathormone eventually results in mobilization of calcium from the skeleton with resultant

bone lesions. Jaw lesions are fairly commonly encountered. Primary hyperparathyroidism is the most common type. It is typically produced by an adenoma within one of the parathyroid glands that produces and secretes functional parathormone. However, carcinomas occasionally will also produce functional hormones. While primary hyperparathyroidism can occur at any age, the population most often affected is middle aged females in distinct contrast to the patient in this case. Secondary hyperparathyroidism can produce an identical radiographic pattern but is typically seen in more elderly patients and is associated with renal failure. The patient in this case had no history of renal disease. The other clinical sequelae associated with hyperparathyroidism (peptic ulcer disease, mental deficits, and stone formation)<sup>2</sup> were all absent in this patient and the serum levels of calcium and phosphate were within normal limits, effectively eliminating it from consideration.

Please re-evaluate the information about this case.



## Multiple Odontogenic Keratocyst

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

The differential diagnosis for multiple radiolucent lesions of the jaws should always include the odontogenic keratocyst (OKC).<sup>1,2</sup> When they occur as multiple lesions, OKCs are often associated with the Nevoid Basal Carcinoma (Gorlin) syndrome.<sup>5</sup> This is an autosomal dominantly transmitted genetic disease that has numerous associated clinical findings in addition to multiple OKCs of the jaws. Basal cell carcinomas involving the skin of the face and neck are a prominent component of the syndrome. These basal cell carcinomas tend to occur at a young age, often in the teenage and young adult years. Skeletal abnormalities, particularly bifid ribs, are another common manifestation. While the OKC typically presents as a unilocular radiolucent lesion, multilocular

OKCs are also commonly encountered.<sup>6</sup> The multilocular appearance of the lesions in this patient, therefore, do not necessarily exclude multiple OKCs from consideration. However, OKC is a true cyst, presenting as a pathologic cavity lined by epithelium. The epithelium lining of the cyst has a very characteristic and easily recognized histopathologic presentation.<sup>2</sup> The epithelial lining shows parakeratinizing stratified squamous epithelium with a uniform thickness of 6-10 cell layers. The basal layer characteristically is palisaded. The epithelium maintains a flat interface, without rete ridge formation, with the underlying connective tissue of the cyst wall. In this case, biopsy of the lesions revealed solid masses of soft tissue without a cystic character arguing against a diagnosis of multiple OKCs. In addition, the histopathology showed no evidence of an epithelial cyst lining eliminating OKCs from consideration.

Please re-evaluate the information about this case.

## Cherubism

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

Cherubism is a rare developmental disease that affects the jaws.<sup>2</sup> The disease has an autosomal dominant inheritance pattern with high penetrance and variable expressivity. In this case there was no prior family history of the condition however, which may be viewed as an argument against the diagnosis. However, cherubism is known to have a relatively high rate of spontaneous mutation as a cause of the disease.<sup>7</sup> In these instances no prior family history of the disease will be present, and a mutation is likely the situation in this case. Offspring of the patient would, however, be at risk for the disease. The gene that has been implicated in producing cherubism has been mapped to chromosome 4p16.<sup>8</sup>

Cherubism is characterized by bilateral expansion of the jaws. The mandible is consistently affected. The maxilla and other facial bones may or may not be involved. The expansion

of the jaws results in the “chubby cheeks” appearance of most of these patients. The resemblance to the “cherubs” depicted in renaissance era paintings gives the disease its distinctive name. Radiographically the lesions are bilateral, multilocular radiolucencies affecting the angles and the ascending rami of the mandible. Lesions in the maxilla, though less commonly encountered, also tend to be multilocular in appearance. In addition to the characteristic facial appearance other oral and dental abnormalities may be apparent including displacement of teeth, failure of eruption, and severe malocclusion. No biochemical abnormalities are found.

Histopathologically, the lesions are characterized by a loose fibrous stroma (Figure 7) with multinucleated giant cells that tend to aggregate focally<sup>9</sup> (Figures 7 and 8). An interesting finding that is specific to cherubism, although not found in all cases, is the eosinophilic condensation and hyalinization of collagen surrounding the small blood vessels throughout the lesion<sup>2</sup> (Figure 9).

## Multiple Simple/traumatic Bone Cysts

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

Although the traumatic bone cyst (TBC) may present as multiple lesions and it occurs almost exclusively in young patients, it has a different clinical and histopathologic presentation than seen in this case. TBC is an idiopathic bone lesion that is thought to be caused by trauma.<sup>2</sup> It is usually asymptomatic but painless swelling may occur. Characteristically, however, at surgery these lesions are described as empty holes by the surgeon. Vigorous curettage of the bony walls of the empty cavity typically yields some tissue for histopathologic analysis, but the

quantity of tissue is usually minimal considering the large size of the lesion seen radiographically. The histopathologic findings are nonspecific. A specimen from the lesion may have spicules of vital bone and extravasated blood but no giant cell lesion as was present in this case. Radiographically, TBC is usually a well delineated, unilocular radiolucency that may scallop upward between the roots of overlying teeth.<sup>10</sup> It only rarely may present as a multilocular radiolucency with expansion. Multiple multilocular TBCs producing expansion would be distinctly unusual and is a strong argument against that diagnosis in this case.

Please re-evaluate the information about this case.

## References

1. Wood, KN, Goaz, PW. Differential Diagnosis of Oral Lesions. 3rd ed. St. Louis: The C. V. Mosby Company 1985. Ch20:471.
2. Neville BW, Damm DD, Allen CM, Bouquot JE. Oral & Maxillofacial Pathology. 2nd ed Philadelphia: WB Saunders Company 2002.
3. Lessa MM, Sakae FA, Tsuji RK, Filho BC, Voegels RL, Butugan O. Brown tumor of the facial bones: case report and literature review. Ear Nose Throat J. 2005 Jul;84(7):432–4. Review.
4. Triantafyllidou K, Zouloumis L, Karakinaris G, Kalimeras E, Iordanidis F. Brown tumors of the jaws associated with primary or secondary hyperparathyroidism. A clinical study and review of the literature. Am J Otolaryngol. 2006 Jul–Aug;27(4):281–6. Review.
5. Auluck A, Suhas S, Pai KM. Multiple odontogenic keratocysts: report of a case. J Can Dent Assoc. 2006 Sep;72(7):651–6.
6. Chirapathomsakul D, Sastravaha P, Jansisyanont P. A review of odontogenic keratocysts and the behavior of recurrences. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2006 Jan;101(1):5–9.
7. Ongole R, Pillai RS, Pai KM. Cherubism in siblings: a case report. J Can Dent Assoc. 2003 Mar;69(3):150–4. Review.
8. Sarda D, Kothari P, Kulkarni B, Pawar P. Cherubism in siblings: A case report. J Indian Soc Pedod Prev Dent. 2007 Mar;25(1):27–9. Review.
9. Yamaguchi T, Dorfman HD, Eisig S. Cherubism: clinicopathologic features. Skeletal Radiol. 1999 Jun;28(6):350–3. Review.
10. Matsumura S, Murakami S, Kakimoto N, Furukawa S, Kishino M, Ishida T, Fuchihata H. Histopathologic and radiographic findings of the simple bone cyst. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 1998 May;85(5):619–25.

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

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