

## Assessment of Bone Scintigraphy Showing Markedly Increased Accumulation in Mandibular and Maxillary Lesions of Cementifying Fibroma

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**ABSTRACT.** This report concerns with three cases of cementifying fibroma showing markedly increased accumulation of  $^{99m}\text{Tc}$ -MDP in mandibular and maxillary lesions. The bone scintigraphic and histopathological findings are presented and discussed.

**Key words :** bone scintigraphy — cementifying fibroma

In recent years, bone scintigraphy has frequently been used to diagnose mandibular and maxillary tumors and to assess the extent of these lesions.<sup>1)</sup> For example, bone scintigraphy is useful in the diagnosis of fibrous dysplasia and aneurysmal bone cyst of the mandible because of the increased uptake in these lesions.<sup>2)</sup> We have recently experienced three interesting cases of cementifying fibroma that manifested with the increased uptake of tracer in both the mandible and maxilla.

### CASE REPORT

Case 1 : K.I., a 51-year-old male

Chief complaint : Gingival swelling on the right side of the mandible.

Past history : Chronic renal failure on hemodialysis three times per week for the last 8 years.

Present illness : In January 1981, a painless swelling of the gingiva was noted on the buccal site of teeth $\overline{5,4,3}$ . In May 1981, the tumor was surgically removed under local anesthesia. In December 1981, the tumor recurred. In June 1983, reoperation was done. Histological examination revealed cementifying fibroma. The patient was referred to Department of Oral Surgery at our hospital for radical resection of the lesion, and was admitted to our hospital in May 1984.

Serum biochemical tests : Alkaline phosphatase was markedly elevated to 577 IU/l (normal 25-80) and C-terminal parathyroid hormone to 13.2 ng/ml (normal less than 1.3). These findings indicate secondary hyperparathyroidism.

Panoramic X-ray of the mandible revealed osteolytic change with a sharply

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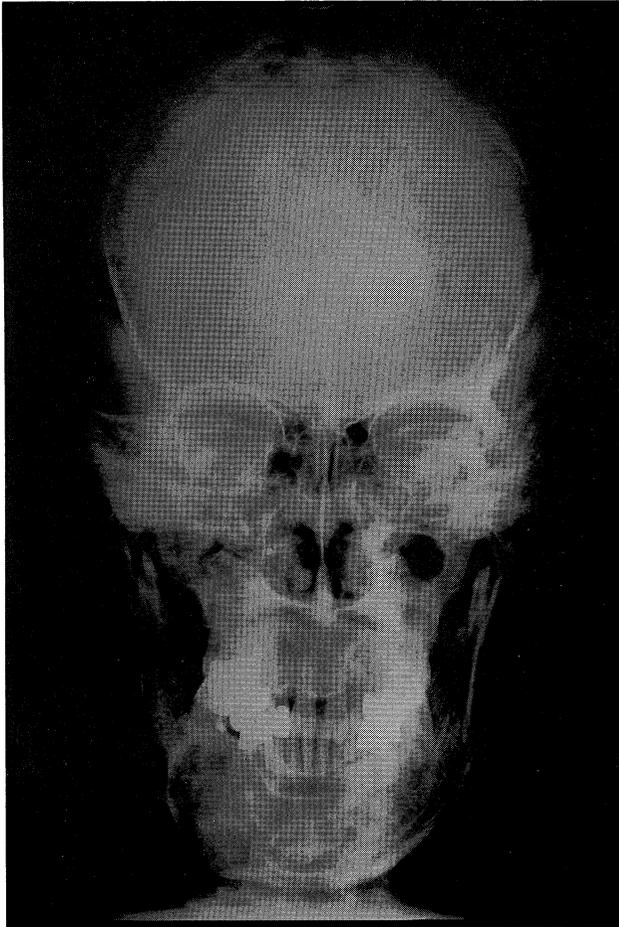


Fig. 1. X-ray picture of the mandible.  
A sharply defined osteolysis is seen in the right mandible.

defined border in the right side (Fig. 1).

**Bone scintigraphic findings :** On the bone scintigram, there was an increased uptake throughout the whole skeleton. Especially, uptake in the mandible was diffusely increased with a pronounced uptake on the right side (Fig. 2).

**Pathological findings :** In the bone, a definite proliferation of osteoblasts and osteoclasts were observed. In the interstitial tissue, a proliferation of capillary blood vessels and mild lymphocytic infiltration was noted. No distinct border between the tumor and the surrounding bone was recognized. In the tumor abundant capillaries with hyaline changes and cementum-like structures with partial calcification were contained. The matrix tissue consisted mainly of a fibrous cellular proliferation (Fig. 3). Pathological diagnosis was cementifying fibroma.

**Case 2 :** S.M., a 40-year-old male

Chief complaint : Gingival swelling in the right mandible.

Family and past history : Non-contributory.

Present illness : In September 1977, extraction of teeth<sup>6,5</sup> was performed.

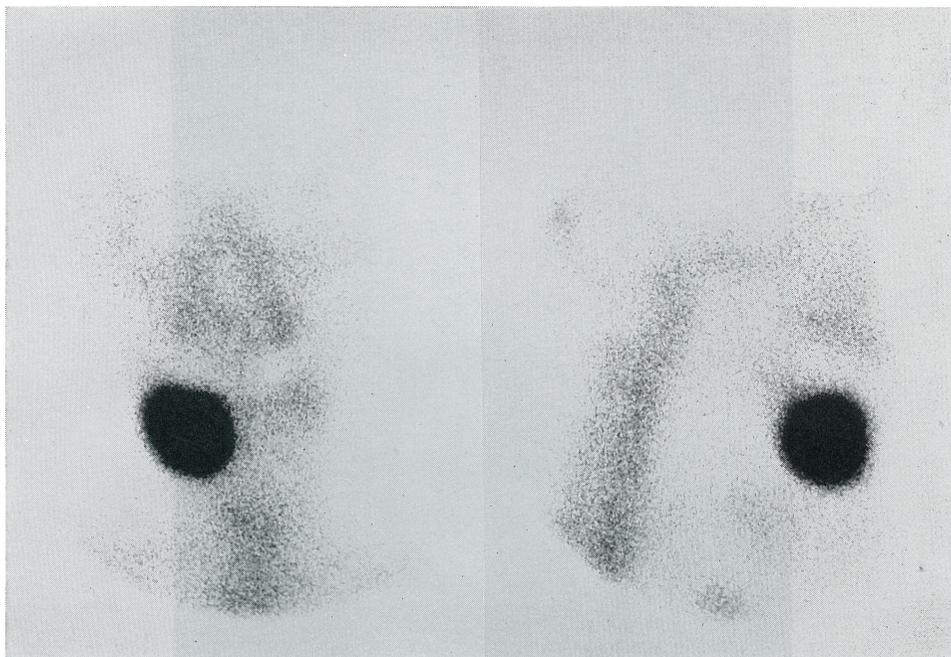


Fig. 2. Bone scintigram (Anteroposterior and right lateral view). Diffuse increase in accumulation was seen over the whole mandible. The uptake was especially high on the right side.

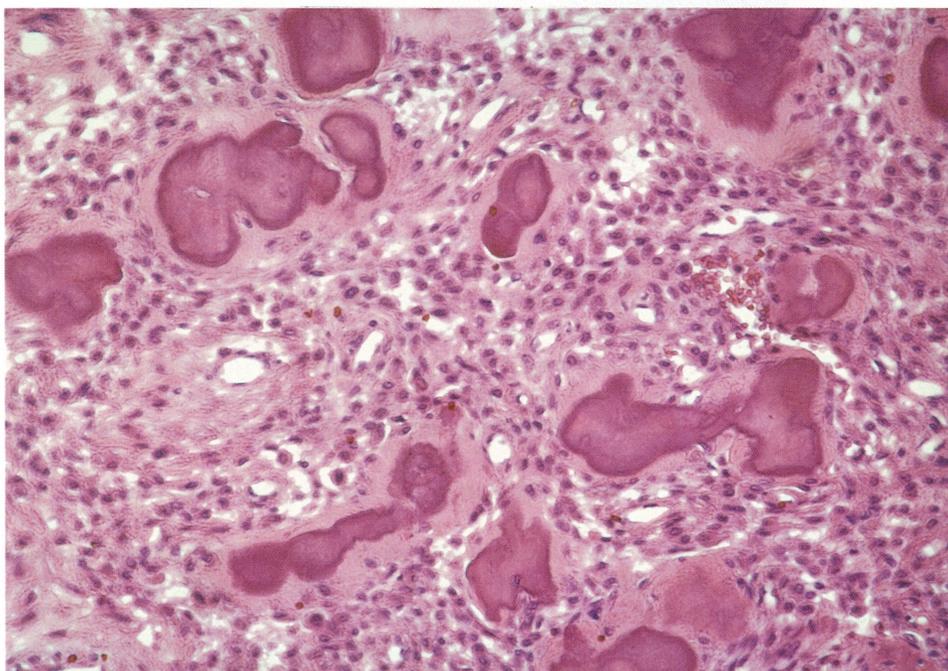


Fig. 3. Histopathological picture. Hyalinized and partially calcified cementum-like structures and fibrous cell proliferation are seen.

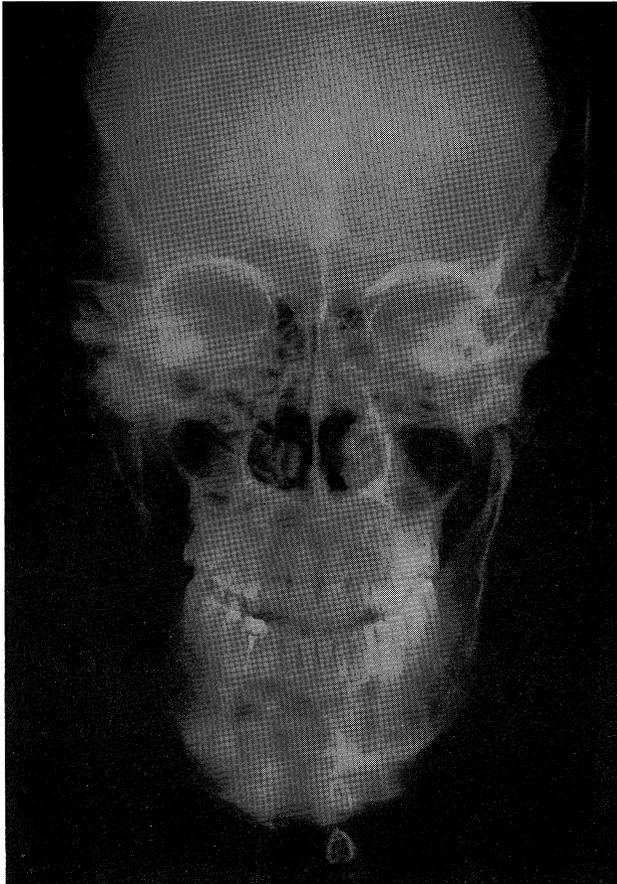


Fig. 4. X-ray picture of the mandible.  
Osteolysis with a sharply defined border is noted in the right mandible.

In December 1977, a painless gingival swelling appeared on the buccal site of the molar region of the right mandible. Although this mass slowly increased in size, no treatment was introduced. In November 1978, the patient consulted Department of Oral Surgery of our hospital, where a bone swelling of the mandible was noted buccally and lingually in the areas of teeth numbers  $\overline{7,6,5,4,3,2}$ .

X-ray findings : A radiolucency with sharply defined borders was noted in the right mandible. Osteolysis without complete disappearance of the cortex was observed (Fig. 4).

Bone scintigraphic findings : An extremely high uptake was noted in the right mandible (Fig. 5).

Pathological findings : The tumor was clearly demarcated from the normal tissue. It consisted of cementum and plenty of irregular osteoid formation. In the small portion of the lesion that showed the osteoid formation, bundle-like fibroblast proliferation which was compatible to fibroma was noted. The pathological diagnosis was cementifying fibroma.

Case 3 : O.A., a 14-year-old girl

Chief complaint : Swelling of the right cheek.

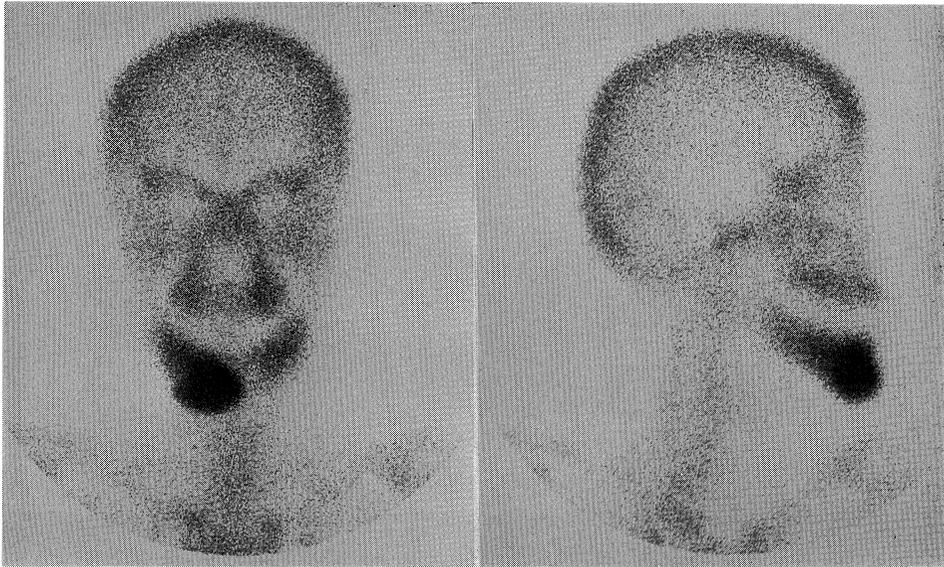


Fig. 5. Bone scintigram (Anteroposterior and right lateral view).  
Markedly increased uptake is noted in the right mandible.



Fig. 6. CT of the maxilla.  
The tumor extends from the right maxillary sinus to the right nasal cavity.

Present illness : A swelling of the gingiva in the right maxilla was noted from time of birth. Because of growth retardation, the patient was admitted to Department of Surgery of our hospital for a detailed examination.

CT findings of the maxilla : The tumor extended from the right maxillary sinus to the right nasal cavity, compressing the surrounding bone on a lateral projection (Fig. 6).

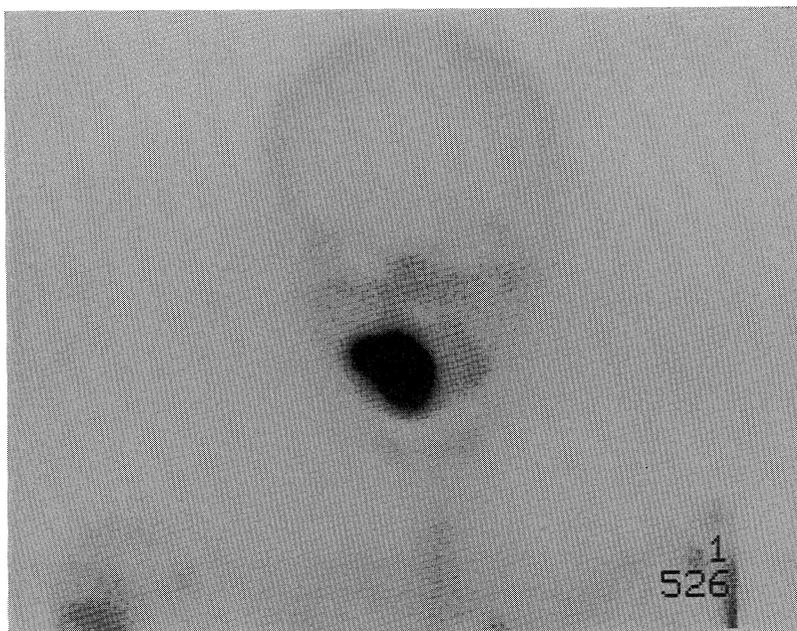


Fig. 7. Bone scintigram (Anteroposterior view).  
Markedly increased uptake is seen in the right maxilla.

Bone scintigraphic findings : Markedly increased uptake was noted in the right maxilla (Fig. 7).

Pathological findings : Fibrous tissue with abundant cellular components and spherical calcifications were observed. Very few inclusion cells were contained in the calcifications. In the stroma a homogeneous appearance, which probably represented cementum, was shown. The diagnosis was cementifying fibroma.

#### DISCUSSION

Tumors originating from the mandible and the maxilla are not rare. Malignant tumors from these sites are usually not detected until symptoms appear and the stage is already advanced. In these cases early and accurate diagnosis is extremely important. The maxilla and the mandible, on the other hand, are frequent sites of occurrence of benign tumors. Therefore, it was very important to clinically differentiate between benign and malignant lesions. While bone scintigraphy is frequently used in cases of tumors of the jaws,<sup>1)</sup> it can not differentiate between benign and malignant lesions, and furthermore, it is not accurate enough to determine the extent of infiltration by the tumor. This may be explained by the fact that the involved tissue tends to show surrounding inflammation. The presence of inflammation gave false positive results on bone scintigraphy.<sup>3)</sup> Benign tumors such as fibrous dysplasia and aneurysmal bone cyst<sup>2)</sup> occurring in the jaws also exhibit a marked uptake of tracer. In the present report, 3 cases of cementifying fibroma showing increased tracer accumulation in the mandible or the maxilla on bone scintigraphy are described. The mechanism of increased uptake was studied based on the pathological findings.

Cementifying fibroma is a benign tumor consisting of fibrous connective tissue with cementum-forming ability and granular cementum,<sup>4)</sup> frequently occurring in the mandible which in adults was commonly manifested as a fibrous bone lesion.<sup>5)</sup> The prevalence of this tumor is rather low among the Orientals. Bone radiology reveals osteolytic change with sharply defined borders. Furthermore, in such lesion small calcified areas were observed. These findings differentiate cementifying fibroma from fibrous dysplasia.<sup>4)</sup> This differentiation is usually difficult clinically. While the mechanism of accumulation of tracers in cementifying fibroma on bone scintigraphy remains unclear, <sup>99m</sup>Tc labeled phosphorous compounds affinity to immature fibrous connective tissue and the property of the cementum being somewhat similar to bone may explain the marked accumulation.

A high uptake and characteristic pattern of accumulation of tracer in the jaws on bone scintigraphy are well known in fibrous dysplasia and aneurysmal bone cysts. In fibrous dysplasia, high accumulation frequently involves the whole mandible and maxilla, while a partial cold lesion is found in the aneurysmal bone cyst.<sup>2)</sup> Bone radiography also shows characteristic findings in each disease. In our 3 cases with cementifying fibroma, in the solitary site marked uptake is characteristic of the disease. This intense uptake of tracer was more prominent in cementifying fibroma than that in acute osteomyelitis. One patient on hemodialysis was complicated with secondary hyperparathyroidism, which was characterized by a uniformly increased uptake in the skull and the mandible<sup>6)</sup> on bone scan. In this patient, associated with the cementifying fibroma of the mandible a localized markedly increased uptake was noted in the mandible.

Thus, as the bone scintigram of the cementifying fibroma is characteristic, special attention should be kept in mind in diagnostic imaging.

#### SUMMARY

Three cases with cementifying fibroma demonstrating a marked uptake of tracer in the mandible or maxilla on bone scintigraphy were presented, and described the characteristics of the associated bone scintigraphic findings.

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