

## Periapical multilocular osteoporotic bone marrow defect

Yun-Hoa Jung, Bong-Hae Cho, Kyung-Soo Nah

Department of Oral and Maxillofacial Radiology, College of Dentistry, Pusan National University

### ABSTRACT

A case of osteoporotic bone marrow defect, which appeared as a well-defined multilocular radiolucency overlapping the roots of mandibular right second molar, was reported. On periapical radiograph, a daughter cyst-like radiolucency was seen at the anterior margin of the lesion making it difficult to rule out odontogenic keratocyst. (*Korean J Oral Maxillofac Radiol* 2005; 35 : 221-3)

**KEY WORDS** : Bone Marrow; Bone Defect; Mandible; Periapical Disease

Osteoporotic bone marrow defect (OBMD) predominantly occurs in the mandible, particularly in middle-aged women, is asymptomatic and requires no treatment.<sup>1-3</sup> However, it is seldom considered in a clinical differential diagnosis.<sup>2</sup> These large marrow spaces may appear to be superimposed over the roots of teeth on radiographs, simulating the appearance of apical pathosis.<sup>1</sup> Barker et al.<sup>2</sup> reviewed 197 cases of OBMD and reported that the radiographic appearance varied from sharply defined radiolucencies with distinct sclerotic borders to extremely ill-defined areas with a moth-eaten appearance. Crawford et al.<sup>1</sup> reported 17 cases of osteoporotic marrow defects of the jaws and described these as being "poorly defined," "large radiolucent area," radiolucent area with "abnormal bony configuration," and "honeycombed". In only two of the seventeen examples presented in Crawford et al.<sup>1</sup> series did the clinician give a marrow space defect as the probable diagnosis. Other diagnoses were osteomyelitis, ameloblastoma, traumatic bone cyst, residual cyst, and fibrous dysplasia.<sup>1</sup>

### Case report

A 48-year-old woman was referred from private practice for evaluation of the cystic lesion at periapical area of mandibular right second molar. The lesion was discovered on a radiograph taken for the treatment of small caries. As it was asymptomatic, the dentist observed it for four months before referral and reported that there was no change in the size of the lesion.

Clinical examination revealed no pain, no bony swelling, and the involved tooth was vital. The patient was under the medication of hypertension, but otherwise healthy.

A panoramic radiograph (Fig. 1) showed a well-defined multilocular radiolucency overlapping the roots of mandibular right second molar. On periapical radiograph (Fig. 2), a daughter cyst-like radiolucency was seen at the anterior margin of the lesion. The initial differential diagnosis included odontogenic keratocyst, ameloblastoma and early stage of fibro-osseous lesion because the inferior margin of the lesion showed sclerotic border that blended into the surrounding bone.

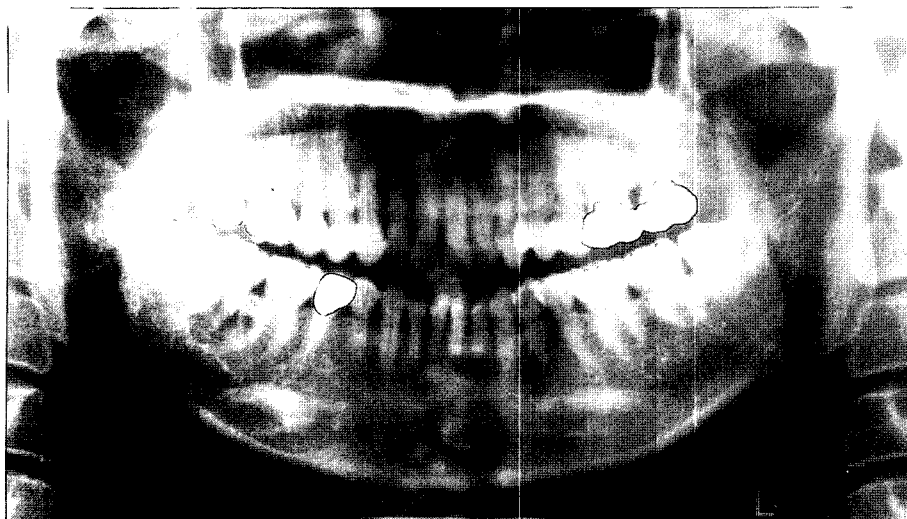
Under local anesthesia, enucleation of the lesion was attempted and the specimen that was removed was sent for histologic examination. Histologically, the specimen revealed bone marrow and viable bone. The bone marrow consisted of areas of hematopoietic marrow composed of focal collections of normocellular erythroid and myeloid elements with occasional megakaryocytes dispersed among mature fat cells (Fig. 3). A diagnosis of osteoporotic bone marrow defect was rendered.

### Discussion

Active hematopoietic marrow is gradually replaced with fatty marrow as people grow older but fatty marrow may be quickly replaced with areas of active hematopoiesis as a demand for blood cell formation increases.<sup>1</sup> Occasionally, foci of hematopoietic or fibrofatty marrow will form a localized collection to produce a paucity of trabeculae and to present a radiolucency in the jaws.<sup>1</sup> Sites most frequently mentioned in the jaws are the condylar process, the mandibular angle, and the maxillary tuberosity.<sup>4</sup>

The pathogenesis is not known, but several suggested possi-

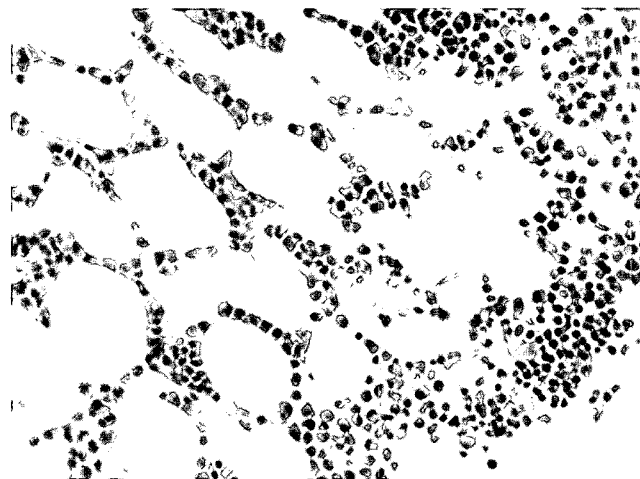
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Correspondence to : Prof. Kyung-Soo Nah  
Department of Oral and Maxillofacial Radiology, College of Dentistry, Pusan National University, Ami-dong, 1-ga, Seo-gu, Busan 602-739, Korea  
Tel) 82-51-240-7471, Fax) 82-51-245-8388, E-mail) ksnah@pusan.ac.kr



**Fig. 1.** A panoramic radiograph shows a well-defined multilocular radiolucency overlapping the roots of mandibular right second molar.



**Fig. 2.** On periapical radiograph, a daughter cyst-like radiolucency is seen at the mesial margin of the lesion.



**Fig. 3.** The bone marrow consists of areas of hematopoietic marrow composed of focal collections of normocellular erythroid and myeloid elements with occasional megakaryocytes dispersed among mature fat cells (H & E stain,  $\times 400$ ).

bilities include (a) bone resorption secondary to marrow hyperplasia in response to an increased demand for blood cells, (b) persistent embryologic marrow remnants, and (c) altered regeneration of bony trabeculae in an area of previous trauma, local inflammation, or extraction.<sup>2</sup>

Barker et al.<sup>2</sup> suggested that OBMD might result from a variety of causes. Up to one third may be explained on the basis of an abnormal healing reaction, while a very small percentage could be explained on the basis of marrow hyperplasia associated with various hematologic disorders. However, the majority of cases offer no ready explanation. It seems reasonable to postulate that this latter group results from as yet unknown stimuli that induce localized marrow hyperplasia, with resultant bone resorption, which eventually becomes visible on radiographs. In a few of these, all that remains in the defect is fatty marrow.

Many of the OBMD lesions were reported asymptomatic,<sup>1,3,5,6</sup> but 26 patients from 197 cases reported by Barkers et al.<sup>2</sup> complained of pain in the area of the lesion. Lipani et al.<sup>7</sup> emphasized the OBMD of the jaw bone might behave somewhat aggressively and produce a painful expansion of the cortical margin. The frequent incidence of such lesions in the edentulous segments of the posterior mandible suggests that the proliferation of hematopoietic marrow elements may be stimulated by odontogenic inflammation or be sequela of repair. Makek et al.<sup>4</sup> also reported that five of their twenty patients presented with pain of no dental cause and one of them had gradual but progressive enlargement of the right mandible resulting in a lateral open bite deformity. In addi-

tion, interestingly enough in this case the lesion was bilateral, with no symptoms attributable to the left-sided lesion

OBMD are often confused with other lesions clinically and are rarely mentioned in a differential diagnosis.<sup>2</sup> The radiographic appearance of these defects is not sufficiently characteristic to permit an exact diagnosis. However, a radiolucent lesion with either distinct or poorly defined irregular borders, located in the posterior mandible of a middle-aged woman, and not associated with a tooth, should suggest an OBMD.<sup>2</sup>

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