Root Resorption Caused by Jaw Infiltration of Multiple Myeloma: Report of a Case and Literature Review

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Abstract

Introduction: Infiltration of the maxillofacial region by multiple myeloma is common and typically appears as punched out osteolytic lesions of the jaws. Although swelling, bone pain, and tooth mobility are characteristic clinical symptoms, root resorption is rare in conjunction with myeloma nests. **Methods:** A case of a 67-year-old man with multiple myeloma is presented. Root resorption of the second mandibular premolar and the first and second molars on the right side, with consecutive tooth mobility, was the initial manifestation of the disease and was primarily detected on a periapical radiograph. The treating dentist referred the patient to the department for further examination, which revealed multiple myeloma. The patient received tandem high-dose chemotherapy and autologous stem cell transplantation as standard myeloma treatment. Intravenous bisphosphonates were administered to curb the osteolytic lesions. **Results:** No signs of bisphosphonate-related osteonecrosis of the jaw were observed until the end of the follow-up period. **Conclusions:** Only 5 reports of myeloma-associated root resorption have been reported in the literature. In all cases, mandibular premolars or molars were involved, and the patients exhibited extensive involvement of the jaw by myeloma. This report highlights the importance of correct interpretation of clinical signs and radiographs by dental specialists in the diagnostic algorithm of systemic diseases. Furthermore, this is an example for the inevitable part of bisphosphonates in the treatment of osteolytic processes. *(J Endod 2014;40:1260–1264)*

Key Words

Bisphosphonates, multiple myeloma, root resorption

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Multiple myeloma is one of the most common hematologic malignancies, with an annual incidence of 60–70 cases per million (1, 2). Most cases occur between the fifth and seventh decade of life, but disease manifestation at younger ages has been reported (1, 2). Multiple myeloma is characterized by the proliferation of clonal plasma cells in the bone marrow and excessive production of monoclonal immunoglobulins in the patient's peripheral blood (3–5), which can be detected as a paraprotein in serum protein electrophoresis (1, 2). Myeloma cells produce mediators that stimulate osteoclasts (6). Thus, nests of myeloma cells can cause osteolytic lesions across the entire skeleton, with predilection sites in the skull, the axial skeleton, and the pelvis (3, 7–9). These lesions can lead to bone pain, pathologic fractures, and hypercalcemia with consequent kidney injury, which are important clinical symptoms (3, 4, 7, 8, 10). Radiologically, these lesions appear as sharply defined unilocular or multilocular radiolucencies without sclerotic borders or as a general reduction in bone density (4, 7–9, 11–13). The radiologic differential diagnosis involves intraosseous malignancies, various odontogenic tumors, acute osteomyelitis, metastases, or Langerhans cell histiocytosis (5, 14, 15).

The diagnosis of myeloma is based on the detection of paraproteins in the serum and urine, the presence of myeloma-related clinical symptoms (eg, renal injury, hypercalcemia, myeloma bone disease, and anemia), and histopathological evidence of excessive amounts of monoclonal plasma cells in the bone marrow (1–3). Multiple myeloma can be classified by analysis of the heavy and light chains of the produced immunoglobulins (1–3). Immunohistochemical staining of surface antigens (eg, cluster of differentiation) is used to clearly identify plasma cells and prove their monoclonality (1, 2, 16). Further differentiation of the myeloma type can be achieved by immunohistochemical staining of heavy and light chains (1, 2, 16).

The therapeutic approach for multiple myeloma is dependent on the patient's age, general health, and related comorbidities (1, 2). Various chemotherapeutic agents, steroids, and autologous stem cell transplantation can be administered to achieve cure or sustained treatment response (1, 2). Treatment response in myeloma is defined as a partial or complete reduction of serum paraproteins and a significant decrease of bone marrow plasma cells to less than 5% (1, 2). Myeloma-associated osteolytic lesions should be treated with bisphosphonates to prevent skeletal related events (1, 2).

About 30% of myeloma patients will experience maxillofacial involvement by the disease (3, 7, 10, 12), and in 14% of myeloma patients, the primary clinical manifestations of the disease will be found in the oral cavity (3, 4, 7, 12, 17). However, jaw involvement is never the only site of myeloma infiltration in the body (18). Signs of multiple myeloma appear more frequently in the mandible than in the maxilla (3, 7, 9, 18). Vincent symptoms (hypesthetic or anesthetic sensation of the lower lip) (19), tooth loosening, pain, swelling, gingival enlargement, and osteolytic lesions can be signs of intraoral myeloma invasion (3–5, 7, 10, 12, 17, 20). Progressive myeloma may lead to amyloidosis with macroglossia (3, 4). Root resorption in association with myeloma infiltrates is extremely rare (11), with only very few cases published to date (4, 7, 12, 17, 21). The following report presents a rare case of multiple myeloma in which tooth mobility and root resorption were the primary clinical manifestations of the disease.

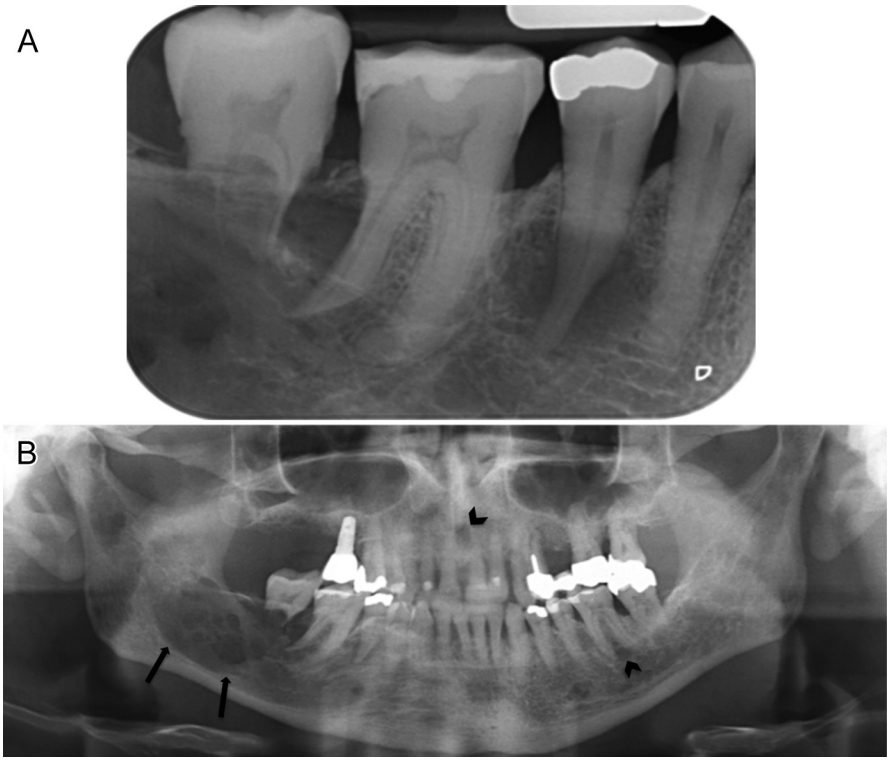

Figure 1. (*A*) A periapical radiograph with signs of premolar and molar root resorption and rarefaction of bone structure. (*B*) A panoramic radiograph showing a large osteolytic lesion without sclerotic border, absence of the lamina dura, and root resorption located in the left mandibular corpus (*arrows*); osteolytic lesions were suspected in the right mandibular corpus and maxilla as well (*arrowheads*).

Case Report

A 67-year-old man was referred to our department for evaluation of progressive tooth loosening with a history of several weeks and excessive root resorption and radiolucency, which had been interpreted from a periapical radiograph by his treating dentist (Fig. 1*A*). The patient reported a history of hypertension and an allergy to ciprofloxacin. The patient denied pain, discomfort, and B symptoms (eg, excessive night sweats, unintended weight loss, and sustained fever). The clinical examination revealed a nontender swelling in the area of the right frontal sinus. There were no palpable preauricular or cervical lymph nodes. The second right lower molar displayed mobility of grade 3 (22) and did not respond to cold thermal testing (23). The probing

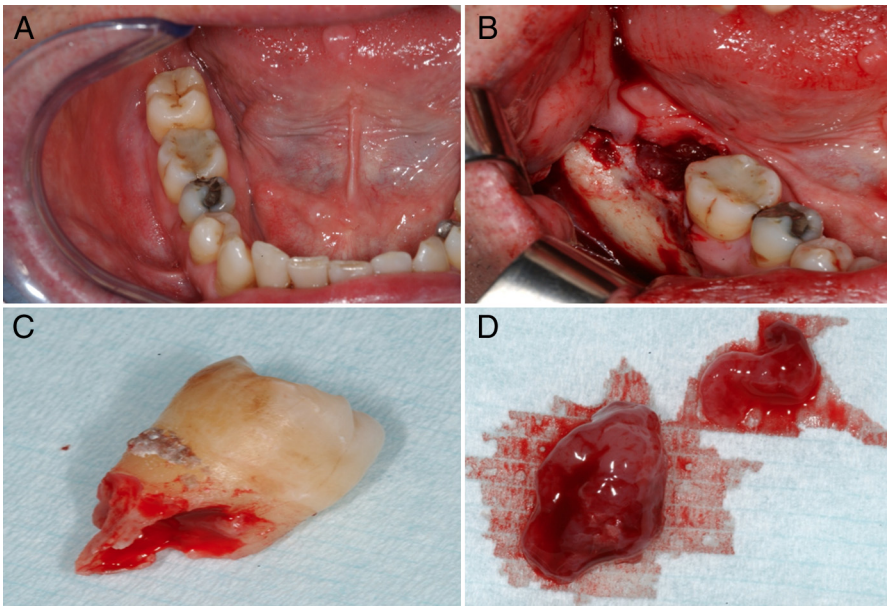

Figure 2. (*A*) A clinical image of the affected region before tooth extraction and biopsy. (*B*) The clinical appearance of the osteolytic lesion after tooth extraction. (*C*) The second mandibular molar with severely resorbed roots. (*D*) Coagulumlike tissue biopsy of the infiltrated area.