

# Bisphosphonate-related osteonecrosis of the jaw in a patient with osteoporosis following treatment of testicular cancer: a case report

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**Abstract** (J Korean Assoc Oral Maxillofac Surg 2015;41:327-331)

Bisphosphonate-related osteonecrosis of the jaw (BRONJ) occurs mainly in female patients. In males the occurrence rate is low, which seems to be related to the low incidence of osteoporosis in men. Unfortunately, BRONJ tends to be ignored in general dental clinics in male patients with a history of osteoporosis treatment. BRONJ occurred in a male patient due to the clinician's lack of interest in the patient's history. In this case, the male patient was on bisphosphonate therapy because of an orchiectomy, and a dental treatment was performed without consideration of his medical history, resulting in BRONJ. We performed careful examinations and treatment with antibiotics and surgical operations. The postoperative healing was successful. In light of this particular case, we concluded that careful listening to the patient's history is very important.

**Key words:** Bisphosphonate-related osteonecrosis of the jaw, Osteoporosis, Orchiectomy

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## I. Introduction

In Korea, the number of cases of bisphosphonate-related osteonecrosis of the jaw (BRONJ) occurring in female patients as a result of dental treatment following medication for postmenopausal osteoporosis has been recently increasing<sup>1</sup>. The American Association of Oral and Maxillofacial Surgeons (AAOMS) define BRONJ as medication-related osteonecrosis of the jaw in cases where antiresorptive or antiangiogenic agents have been administered, continuous bone exposure in the maxillofacial area for a period of more than eight weeks has been confirmed, and radiation therapy of the maxillofacial area has not been performed<sup>2</sup>. The AAOMS also describe treatment methods according to the classifications determined by the patient's symptoms<sup>2</sup>. Although

BRONJ occurs more frequently in females, there are cases of BRONJ occurring in males as well. These are mainly related to a history of malignancy, multiple myeloma, and osteoporosis which occurs as a result of aging<sup>3</sup>.

## II. Case Report

A male patient in his late eighties visited our department from a local clinic for treatment of osteonecrotic lesions of the right posterior maxillary region. He had undergone a tooth extraction (the first right upper molar) at a local clinic three years ago. The sequestrum was exposed through the unhealed extraction wound with purulent discharge. The surrounding soft tissue showed erythematous and edematous gingiva (Fig. 1)

The patient's medical history revealed that he had an orchiectomy to remove diffuse large B cell lymphoma from his testicles followed by chemotherapy and radiation therapy to his para-aortic lymph nodes and pelvic region six years prior. Two years after the cancer treatments, he was diagnosed with osteoporosis and took alendronate (Fosamax Tab. 70 mg; MSD Korea, Seoul, Korea) once a week until visiting our department. At the time of osteoporosis diagnosis, his bone mineral density T-score was -2.7.

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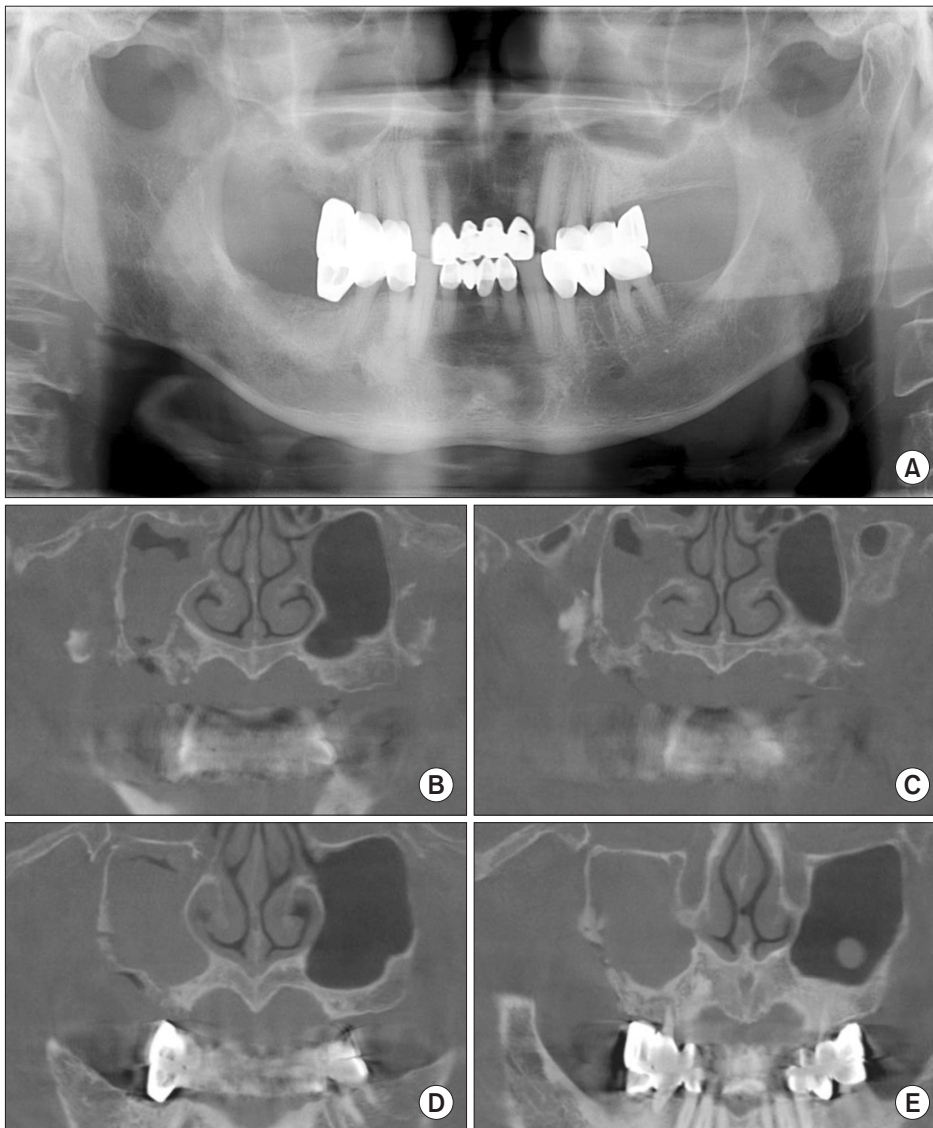
**Fig. 1.** Initial intraoral picture. The sequestrum was seen in the right upper molar area surrounding with edematous and erythematous gingiva.

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Upon a radiologic study, we found sequestrum formation in the #16 area, which had a well-defined margin, making it easily distinguishable<sup>4</sup>. The region extended beyond the alveolar bone into the right maxillary sinus (Fig. 2), and a bone scan image showed increased intake in the right maxillary area.(Fig. 3)

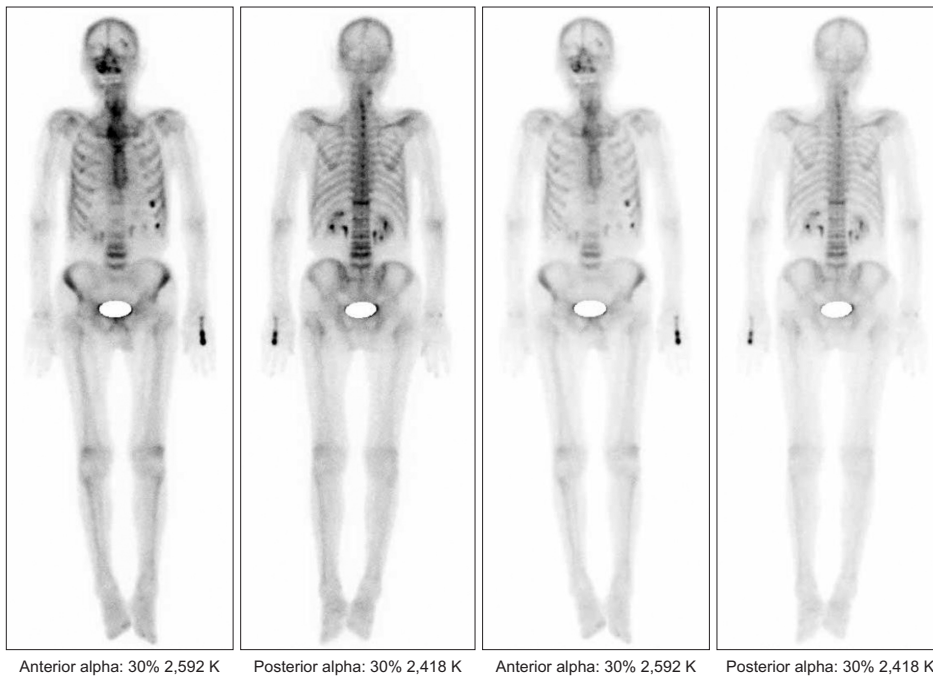
Because there was an exposed bone lesion that extended to the right maxillary sinus, the patient was diagnosed with stage 3 BRONJ according to the AAOMS classification criteria<sup>2</sup>, and conservative treatment was primarily given.

The laboratory tests showed carboxy-terminal collagen crosslinks (CTX) in serum 0.174 ng/mL, vitamin D 11.9 ng/mL (reference value, 30.1-100.0 ng/mL), and serum osteocalcin 1.4 ng/mL (reference value, 5-25 ng/mL). After an endocrinology consult, it was confirmed that surgical intervention would be possible and vitamin D (0.5 µg, once a day, Onealfa Tab.; Ilsung Pharmaceuticals, Seoul, Korea) was prescribed.

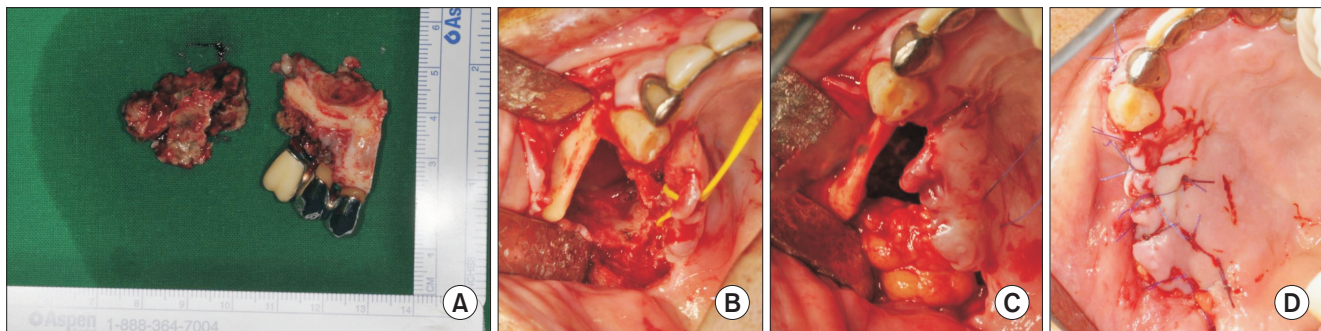


**Fig. 2.** Preoperative radiography. A. Panoramic X-ray. B-E. Cone-beam computed tomography (CBCT). In radiologic study, the sequestrum formation was seen on #16 area with well-defined margin extended beyond the alveolar bone reaching to the right maxillary sinus. The CBCT images show increased haziness on the right maxillary sinus.

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**Fig. 3.** Bone scan images show increased uptake in the right maxilla area. Do-Sup Kim et al: Bisphosphonate-related osteonecrosis of the jaw in a patient with osteoporosis following treatment of testicular cancer: a case report. *J Korean Assoc Oral Maxillofac Surg* 2015



**Fig. 4.** Intraoperative pictures. A. The excised specimen of right maxilla. B-D. Surgical procedure. After partial maxillectomy, we can see clear margin (B). To close the wound primarily, we use the buccal fat pad flap (C) and suture (D). Do-Sup Kim et al: Bisphosphonate-related osteonecrosis of the jaw in a patient with osteoporosis following treatment of testicular cancer: a case report. *J Korean Assoc Oral Maxillofac Surg* 2015

After admission, intravenous antibiotics (four times a day, Fullgram Injection 300 mg; Samjin Pharm, Seoul, Korea) were given. We performed a surgical operation including sequestrum resection, partial maxillectomy, and extraction of the first and second premolars. The defect area was covered with a buccal fat pad flap.(Fig. 4) In order to relieve sinus symptoms, mucolytics and nasal decongestants were administered for two weeks following surgery.

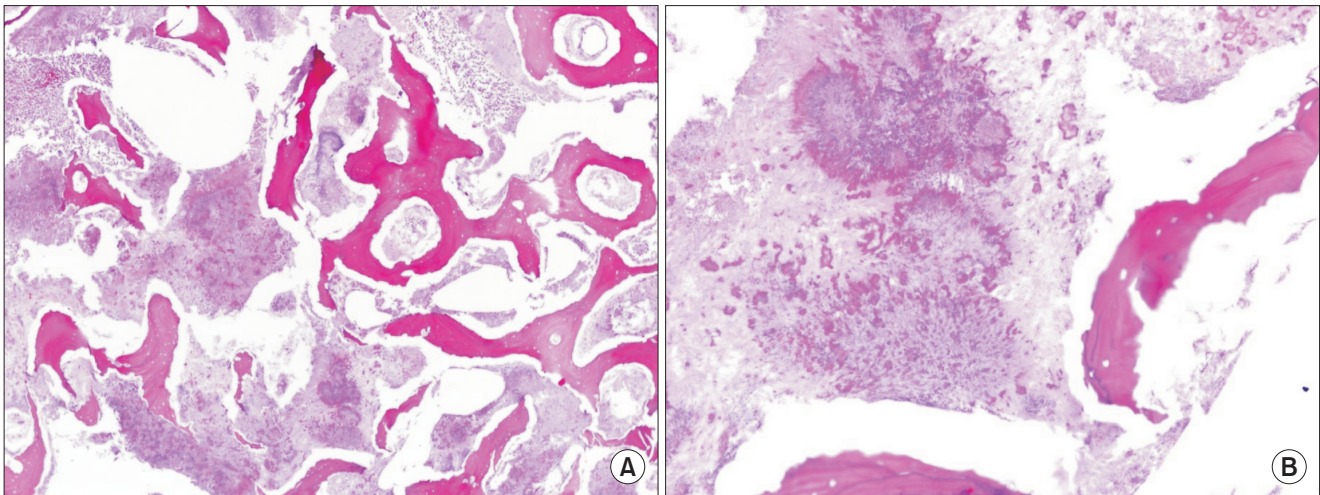
Biopsy results confirmed actinomycotic osteomyelitis<sup>4</sup>.(Fig. 5) Postoperative healing was uneventful. After discharge, regular follow-up visits were conducted. There were no signs of recurrence and a clean and fully healed mucosa was observed in the intraoral picture taken sixty days postoperatively.(Fig. 6) The postoperative X-ray showed a clearly resected

bone margin and an uneventfully healed maxilla.(Fig. 7)

### III. Discussion

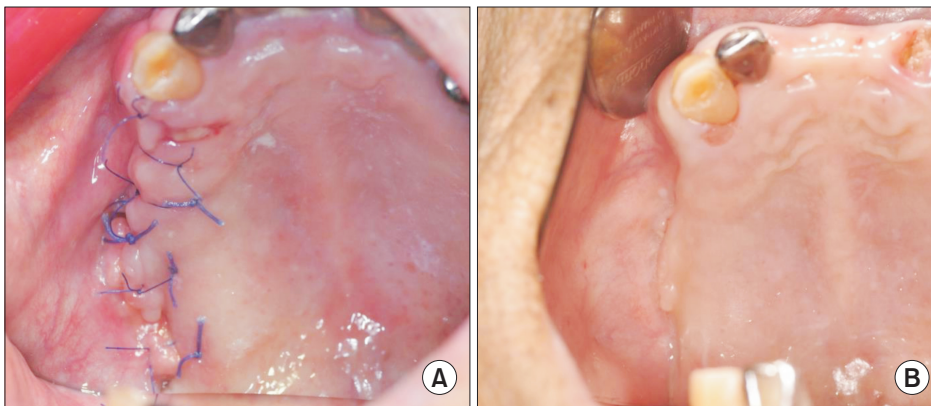
Underlying diseases related to BRONJ include primarily malignant tumors, multiple myeloma and osteoporosis<sup>3</sup>. In this case, the patient's past medical history was significant for malignancy and osteoporosis, although osteoporosis was the primary indication for bisphosphonate treatment.

BRONJ is more common in females because menopause is the main etiology of osteoporosis. The male-to-female incidence ratio of BRONJ is about 4:6, regardless of the underlying diseases<sup>5,6</sup>. In our research from 2007 to 2014, there were 11 male and 213 female BRONJ patients. In accordance



**Fig. 5.** Microscopic pictures of specimen (H&E staining, A:  $\times 40$ , B:  $\times 200$ ). Sample shows the sulfur granule and bacterial colony, which is a histologic character of *Actinomyces*.

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**Fig. 6.** Postoperative follow-up. A. Postoperative 4 days intra-oral photo. B. Postoperative 60 days intra-oral photo. Intraoral pictures show normal healing process.

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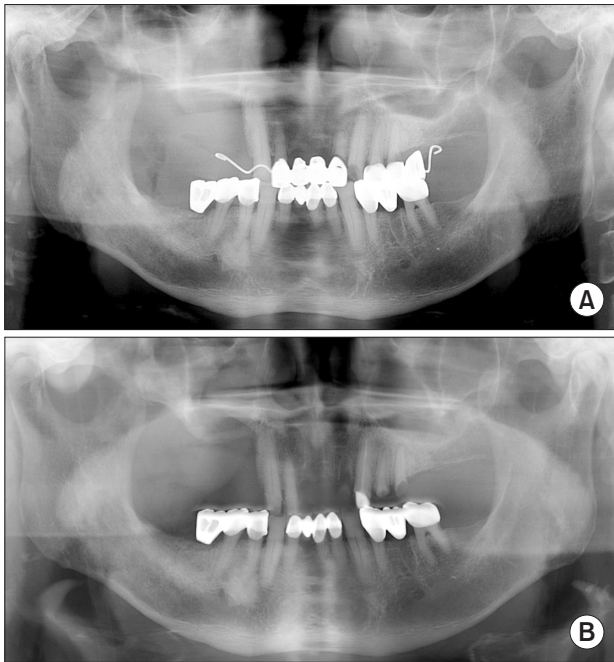
with this, a medical history including osteoporosis is likely to be overlooked more frequently in male patients before dental treatment. In this case, osteoporosis developed as a result of aging and hypogonadism after receiving an orchiectomy and the patient was treated with alendronate (Fosamax Tab. 70 mg) for about four years. In this condition, bone turnover activity is suppressed and the tooth extraction was performed indiscriminately. We conclude that BRONJ might have developed through this serial pathway.

Osteoporosis in males can occur due to a variety of reasons, such as old age, steroid abuse, alcoholism and hypogonadism<sup>7</sup>. Among these, hypogonadism is a commonly occurring consequence associated with orchiectomy<sup>7</sup>. Because complications such as pelvic fracture may frequently occur with hypogonadism, bisphosphonate therapy is necessary for this group of patients. When a dentist first meets these patients, a careful medical history is required as there is a risk

of BRONJ. Osteoporosis in males tends to be overlooked or underestimated compared with females. Only 10% of male patients receive treatment for osteoporosis due to lack of awareness<sup>8</sup>, and the incidence of osteoporosis tends to increase more significantly in males over 70 years of age compared with females<sup>7</sup>.

Cases of BRONJ affecting the maxilla are rarer than those in the mandible<sup>9</sup>. However, in the case of advanced maxillary lesions, sinusitis or intracranial complications can occur<sup>10,11</sup>. As most of these patients are elderly and many have a history of variable diseases, they require prompt treatment.

In many BRONJ cases, infections and recurrence may occur; in other words, the healing process is often compromised for many reasons. Because of impaired vascularity, the healing alveolus may be vulnerable to bacterial infections. In order to reduce exposure to bacterial infections, primary closure is important<sup>12</sup>. We performed a sequestrectomy and partial



**Fig. 7.** Postoperative X-ray images show clearly resected bone margin and no signs of recurrence. A. Postoperative panorama X-ray. B. Postoperative 120 days panorama X-ray.

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maxillectomy, and primary closure with a buccal fat pad flap. The buccal fat pad flap is useful to cover soft tissue defects in the posterior maxillary regions, as well as other open wounds of the oral and maxillofacial regions, because it has high vascularity and adipose tissue stem cells which accelerate the healing process of necrotic lesions<sup>13</sup>.

In this case, after successful primary closure with local mucosa and the buccal fat pad flap, the wound healed uneventfully.

### Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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