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**Use of FDG-PET to evaluate hyper baric oxygen therapy for  
bisphosphonate-related osteonecrosis of the jaw**

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**Abbreviated title: FDG-PET to evaluate HBO therapy for BRONJ**

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**Abstract:**

An 80-year-old man presented with painful swelling in the mandibular region and fistula with pus discharge that developed after tooth extractions. He had taken oral alendronate sodium hydrate and prednisolone for osteoporosis for five years. The lesion was diagnosed as bisphosphonate-related osteonecrosis of the jaw. FDG-PET revealed a high accumulation of FDG in the right mandibular region. The patient underwent hyperbaric oxygen therapy twenty times. FDG-PET SUVmax drastically decreased from 5.6 to 1.8 after hyper baric oxygen therapy, paralleling the change in clinical symptoms, while other modalities did not show remarkable changes. This is the first study demonstrating the utility of FDG-PET in monitoring hyper baric oxygen therapy for bisphosphonate-related osteonecrosis of the jaw.

**Key Words:** bisphosphonate-related osteonecrosis of the jaw, FDG-PET, hyper baric oxygen therapy

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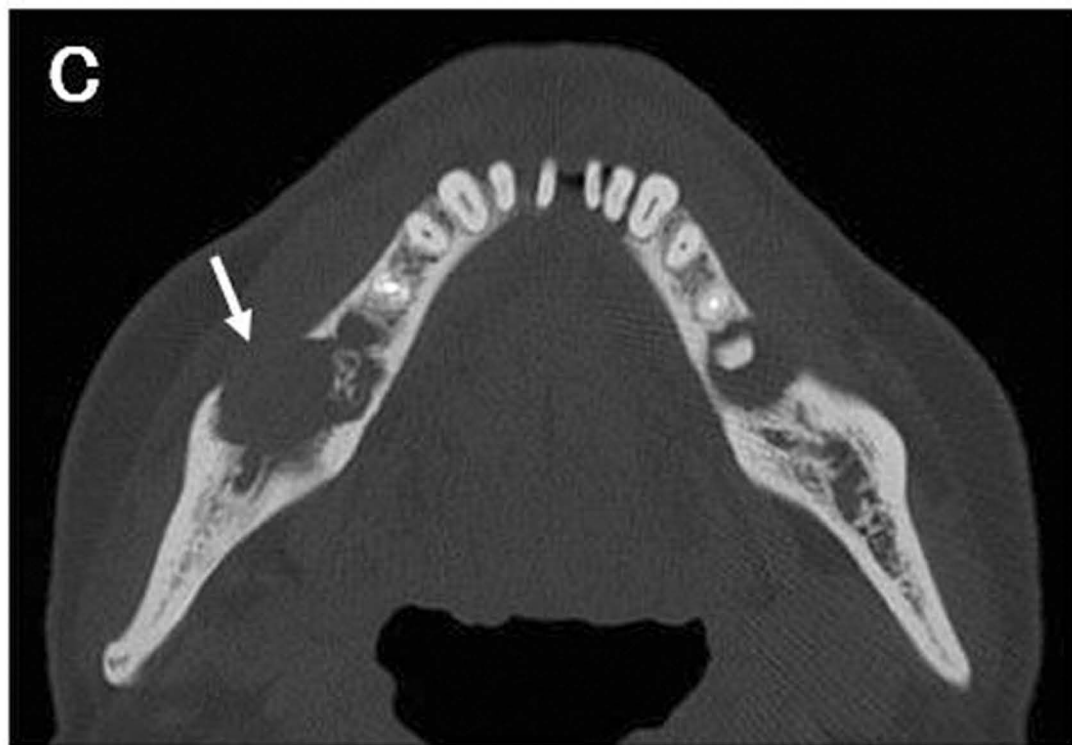
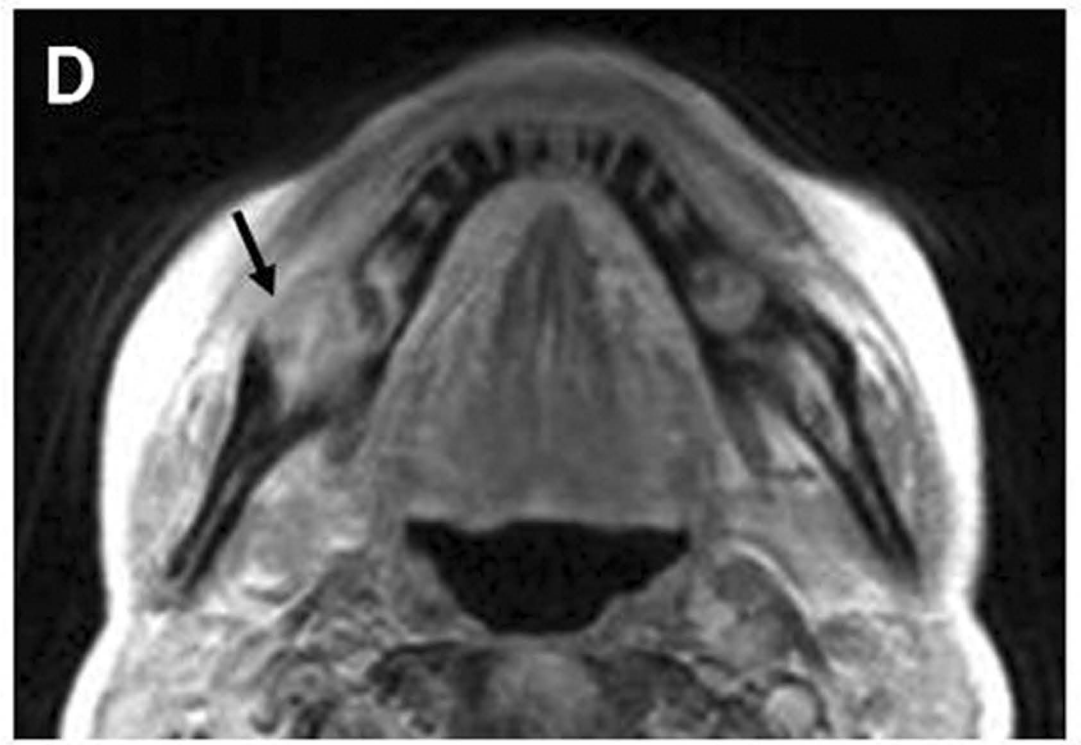
## Figure Legends

**FIGURE 1.** An 80-year-old man had a history of oral administration of alendronate for five years. A: Panoramic radiograph before extraction of the lower right first and second molars (black arrows) showed only periodontitis in the whole mandible. B: Panoramic radiograph 4 months after extraction of teeth showed extensive bone destruction (black arrows), consistent with bisphosphonate-related osteonecrosis of the jaw. C: Axial CT showed osteolytic changes and sequestration accompanied by diffuse osteosclerosis (white arrow). D: Axial T1-weighted contrast-enhanced MR showed soft tissue mass of the right mandibular cancellous bone with some contrast enhancement (black arrow).

**FIGURE 2.** The patient underwent hyperbaric oxygen therapy (HBO) twenty times, resulting in the disappearance of clinical symptoms including pain, swelling and fistula. A (Before HBO): Bone scintigraphy revealed increased RI uptake in the right mandibular region. B (Before HBO): Axial and coronal FDG-PET images showed a high FDG accumulation (SUVmax = 5.6) in the lesion. C (After HBO): Bone scintigraphy did not show remarkable changes compared with the image taken before HBO (A). D (After HBO): FDG-PET revealed normalization of the FDG accumulation (SUVmax = 1.8) consistent with the absence of clinical symptoms. Based on PET evaluation, the patient successfully underwent conservative minor surgery, avoiding continuous resection of the mandible.

The management of patients with bisphosphonate-related osteonecrosis of

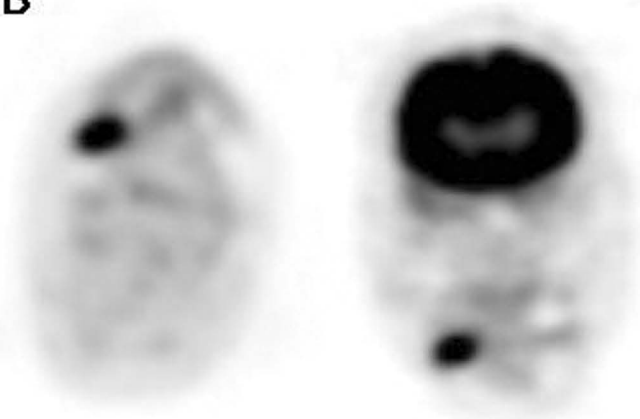
the jaw remains extremely difficult and empiric.<sup>1-3</sup> Although the utility of HBO in the treatment of this condition is currently under investigation,<sup>4,5</sup> some studies have reported that HBO was helpful in the treatment of bisphosphonate-related osteonecrosis of the jaw.<sup>5-8</sup> This is the first study to demonstrate the usefulness of FDG-PET in monitoring HBO therapy for bisphosphonate-related osteonecrosis of the jaw.

**A****B****C****D**

**A**



**B**

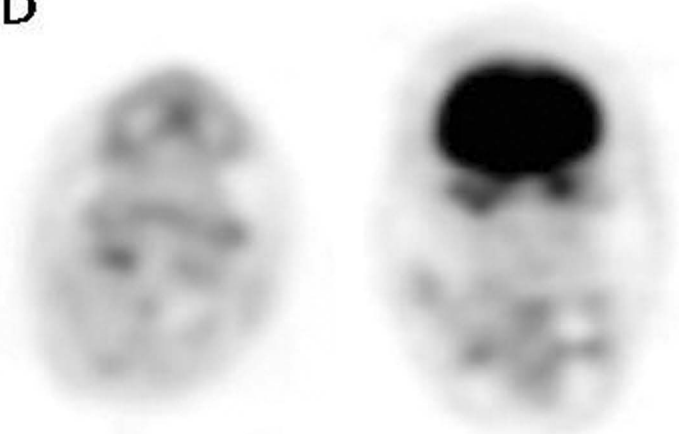


before HBO

**C**



**D**



after HBO