

# Bilateral Maxillary Reconstruction Using Fibular Flap in Bisphosphonate-related Osteonecrosis

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**Summary:** Recent reports have shown successful transfer of vascularized fibular flap in bisphosphonate-induced mandibular osteonecrosis. We present a case of a 50-year-old patient who presented with bisphosphonate-related osteonecrosis of bilateral maxilla, which is reconstructed using a fibular flap. (*Plast Reconstr Surg Glob Open* 2016;4:e1045; doi: 10.1097/GOX.0000000000001045; Published online 29 September 2016.)

**B**isphosphonates are used for treatment of osteoporosis and metastatic bone lesions in multiple myeloma and breast cancer.<sup>1</sup> Bisphosphonate-related osteonecrosis of the jaw (BRONJ) is known as an adverse effect of bisphosphonate therapy.<sup>2</sup> Surgical treatment of BRONJ is often ineffective and should be considered only for symptomatic patients with extensive osteonecrosis.<sup>1,3,4</sup> Recent reports have shown the successful transfer of a vascularized fibular flap in bisphosphonate-induced mandibular osteonecrosis.<sup>5-7</sup>

We report a case of a 50-year-old patient who presented with bilateral maxillary BRONJ, which was reconstructed using a fibular flap. This is the first report of a vascularized fibular bone graft for reconstruction of bilateral maxilla in BRONJ.

## CASE REPORT

A 50-year-old woman came to us presenting an extensive bone exposure of the bilateral maxilla and two segmental defects with floating maxilla. She had been given monthly infusions of zoledronate acid (Zometa; Novartis Pharmaceuticals, East Hanover, N.J.) for 59 months as treatment for metastatic bone dissemination from breast cancer since August 2004. With the diagnosis of BRONJ, zoledronate was stopped for 42 months, computed tomographic and magnetic resonance imaging confirmed the clinical suspicion of BRONJ, and the maxilla was connected to midface only with the vomer (Fig. 1).

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Surgery was performed using an intraoral maxillary vestibular approach to the maxilla, which was resected up to and including apparently “healthy bone” (Fig. 2). Immediate reconstruction with a single vascularized fibular flap was performed to replace two maxilla defects by resecting the midportion of the fibula with no damage to the periosteum and vascular pedicle, after the donor site was screened to exclude metastases (Fig. 3).

Osteosynthesis was performed with two titanium miniplates on each site. She suffered from aspiration pneumonia postoperatively, treated with intravenous antibiotics, and discharged home after 14 days of hospitalization. Healing proceeded uneventfully without any adverse signs of wound healing or compromise to the vascularity of the flap. The patient was very satisfied with her results (Fig. 4). Her maxilla was no longer floating, and she was able to bite and chew something tough.

## DISCUSSION

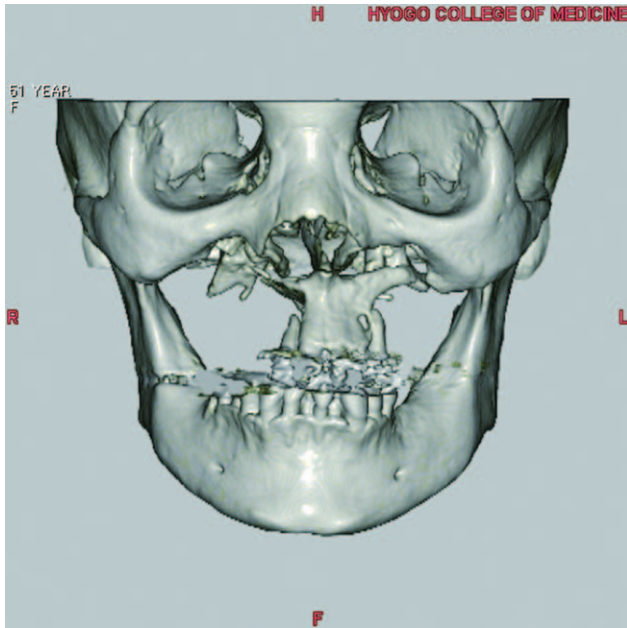
The first case of BRONJ was reported in 2003 in the United States.<sup>2</sup> BRONJ is commonly induced by tooth extraction in patients treated with long-term, potent, high-dose intravenous bisphosphonates for the management of multiple myeloma, breast cancer, or prostate cancer.

The following criteria have to be fulfilled<sup>1</sup>:

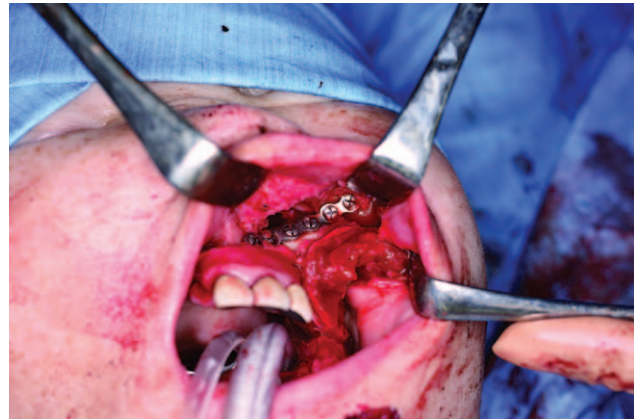
1. Current or previous treatment with a bisphosphonate
2. Exposed, necrotic bone in the maxillofacial region that persisted for more than 8 weeks
3. No history of radiation therapy to the jaws

The treatment of patients with BRONJ is still unclear: antibacterial mouth rinses, antibiotic therapy and pain control, surgical debridement, or resection.<sup>1,4</sup> Stage-specific treatment is recommended for management of BRONJ.<sup>1</sup> In the treatment of advanced BRONJ, the possibility of microvascular reconstruction has to be investigated.<sup>8</sup> Many

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**Fig. 1.** Radiographic appearance at preoperation. Three-dimensional computed tomographic demonstrates the extension of the osteonecrosis to bilateral maxilla.



**Fig. 3.** Intraoperative view of the flap set into the left defect. The vascular pedicle is tunneled through the left maxilla and cheek to the facial vessels.



**Fig. 2.** Appearance at surgery with complete debridement of the necrotic bone.



**Fig. 4.** Radiographic appearance at 6 mo post operation. Three-dimensional computed tomographic demonstrates the rigid fixation of the fibula flap with bilateral maxilla.

reports on vascularized bone graft reconstruction of the mandible in BRONJ have been published recently<sup>5,6,8</sup>; however, there is no study reporting maxillary reconstruction using fibular flap in bisphosphonate-related osteonecrosis. Cordeiro and Chen<sup>9</sup> have reported about the algorithm for midface reconstruction after total and subtotal maxillectomy. Our BRONJ case would fall under the category of type IIB defects—subtotal maxillectomy defects. For type IIB defects, an osteocutaneous free flap is needed from the algorithm. Ilium and the scapula, which are rich in bone marrow, are commonly involved in metastasization,<sup>10</sup> and they are not suitable for osteocutaneous flap's donor site in our case. By contrast, the fibula is rarely the site of metastatic bone disease. For this reason, we have adopted the fibula flap for this patient.

The effect of the transferred flap with a new input of blood supply might improve the surrounding tissue affected by the avascular necrosis caused by bisphosphonate.<sup>5</sup> Also, patients with reasonable life expectancy with regard to their malignant disease should be considered for microvascular tissue transfer after aggressive resection of the affected region.

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