Management of Bisphosphonate-Related Osteonecrosis of the Jaw With a Platelet-Rich Fibrin Membrane: Technical Report

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Bisphosphonate-related osteonecrosis of the jaw (BRONJ) is a challenging complication resulting from the long-term application of bisphosphonates. In most cases, BRONJ occurs after a surgical procedure involving the jawbone. Currently, the management of BRONJ remains controversial, and there is no definitive treatment other than palliative methods. Platelet-rich fibrin (PRF) represents a relatively new biotechnology for the stimulation and acceleration of tissue healing and bone regeneration. This technical note describes the total closure of moderate bone exposure in persistent BRONJ in 2 weeks with a double-layer PRF membrane. PRF may stimulate gingival healing and act as a barrier membrane between the alveolar bone and the oral cavity. PRF may offer a fast, easy, and effective alternative method for the closure of bone exposure in BRONJ.

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Bisphosphonate-related osteonecrosis of the jaw (BRONJ) is characterized by exposed necrotic bone, which can be accompanied by pain, swelling, paresthesia, suppuration, soft tissue ulceration, and intra- and extraoral sinus tracts.[1,2] The incidence of BRONJ is higher with bisphosphonates (BPs) administered monthly through a parenteral route than with oral BPs taken weekly. Most BRONJ cases occur after surgical procedures of oral tissues. However, 30% of cases occur spontaneously.[3] Although the reported frequency of BRONJ is low, it causes complications in dental and oral and maxillofacial surgical treatments of patients receiving BPs. The most effective treatment for BRONJ is still controversial and a challenging issue for oral and maxillofacial surgeons.

Although antiresorptive therapies other than BPs and receptor activator of nuclear factor-κB ligand inhibitor therapies are claimed to cause osteonecrosis of the jaws, BPs are responsible for most of the concern. The most accepted pathologic etiology of BRONJ is oversuppression of bone turnover and inhibition of angiogenesis owing to systematic usage of BPs.[2,4,5] Despite BPs having a specific effect on osteoclasts and a great affinity to bone, the loss of oral mucosa in almost every BRONJ case raises the question of whether they affect oral soft tissue.

Several studies have examined whether BPs have an adverse effect on oral epithelial and mucosal tissues.[6-10] The results of these studies have been consistent, showing that nitrogen-containing BPs decrease oral epithelial cell migration, promote apoptosis, disturb cell viability, and impede oral mucosa wound healing.

Platelet-rich fibrin (PRF) is a second-generation platelet concentrate (natural autologous fibrin matrix) that was first described by Choukroun et al[11] in 2000. It regulates inflammation and stimulates chemotactic factors involved in the immune response.[12] PRF contains a substantial quantity of fibrins, platelets, and leukocytes. It secretes 3 proinflammatory cytokines (interleukin-1β, interleukin-6, and tumor necrosis factor-α), an anti-inflammatory cytokine (interleukin-4), and a key promoter of angiogenesis (vascular endothelial growth factor).[13] PRF also accelerates angiogenesis, the multiplication of fibroblasts and osteoblasts,

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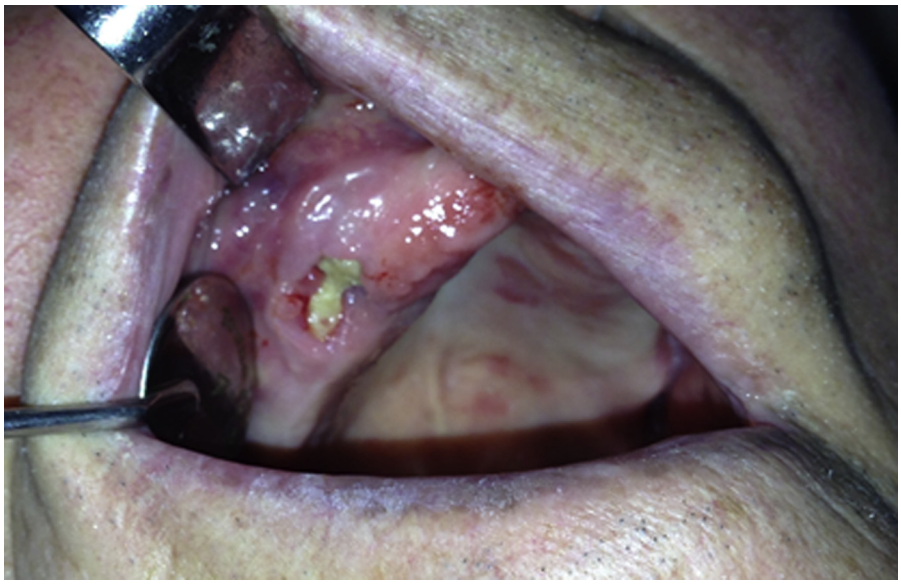

FIGURE 1. After 2 months of conservative treatment, gingival inflammation was released and necrotic bone exposure was 5 × 10 mm.

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and cicatrization.[14] In recent years, PRF has been used as an autologous grafting material because of its ability to accelerate physiologic wound healing and new bone formation. PRF may aid wound healing and the closure of bone in BRONJ. In this technical note, the treatment of moderate bone exposure with a PRF membrane in BRONJ is described.

Technique

A 75-year-old man was referred to the authors' clinic for an unhealed tooth extraction socket and pain after removal of the upper right first premolar tooth. Intraoral findings were an unhealed tooth socket of 4 months' duration, purulent drainage, inflamed gingiva, and an exposed and necrotic jawbone.

The patient had type 2 diabetes, prostate enlargement, and recurrent multiple myeloma. He was taking the following medications: Glucophage (metformin 500 mg 2 times a day; Bristol-Myers Squibb, New York, NY), Flomax (tamsulosin hydrochloride 0.4 mg/day; Flomax, Livermore, CA), and alternating therapy using Zometa (zoledronic acid 4 mg/month; Novartis, Basel, Switzerland) and Aredia (pamidronate disodium 90 mg/month; Novartis). The patient had received intravenous alternating Zometa-Aredia therapy for 3 years for the management of recurrent multiple myeloma.

According to the patient's clinical and radiologic findings, the diagnosis was BRONJ. Superficial curettage was performed at the BRONJ area 2 times a month, and combined antibiotics (amoxicillin/clavulanic acid 1,000 mg + metronidazole 500 mg) were prescribed for 3 weeks.

After 2 months conservative treatment, the patient showed no recurrence of gingival inflammation, infection, and suppuration. However, the amount of bone exposure (5 × 10 mm) remained the same (Fig 1). The patient could not use his dentures comfortably owing to the BRONJ. A drug holiday from Zometa and Aredia was not possible because of the active period of multiple myeloma.

The exposed bone was covered with 2 layers of PRF membrane (Fig 2). After removal of the necrotic alveolar bone, the first layer of the PRF membrane was inserted into the alveolar bone cavity. The second layer of the PRF membrane was placed superficially, and the edges of the membrane were placed under the

FIGURE 2. Two pieces of platelet-rich fibrin obtained from 20 mL of autologous venous blood.

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