

Short communication

Reconstruction of a mandibular defect after bisphosphonate-related osteonecrosis of the jaw

Y.-X. Guo, G. Misra, C.-B. Guo, J.-G. An*

Department of Oral and Maxillofacial Surgery, Peking University School and Hospital of Stomatology

Accepted 23 June 2016

Available online 3 August 2016

Abstract

We describe the reconstruction of a mandible damaged by bisphosphonate-related osteonecrosis of the jaw (BRONJ) using the simple and safe combination of a reconstruction plate and patching with a submandibular gland.

© 2016 The British Association of Oral and Maxillofacial Surgeons. Published by Elsevier Ltd. All rights reserved.

Keywords: Bisphosphonate; Osteonecrosis of the Jaw; Reconstruction

Introduction

Bisphosphonates are commonly used in the treatment of metabolic bone disease, multiple myelomas, and metastatic bone disease. Large doses taken intravenously can lead to bisphosphonate-related osteonecrosis of the jaw (BRONJ).¹ Decisions about treatment are based on factors such as age, sex, the stage of the disease, the severity of the BRONJ, the size of the lesion, exposure to drugs, and the presence of coexisting diseases.² Patients with pathological fractures of the mandible with a continuity defect often require segmental resection and could require immediate reconstruction. Reconstruction with free-vascularised bone is not feasible because necrotic bone could be present, or develop at the margin of the resection.³ We describe a defect caused by BRONJ that we successfully treated by patching with a submandibular gland and a reconstruction plate.

* Corresponding author. Department of Oral and Maxillofacial Surgery, Peking University School and Hospital of Stomatology, 22 Zhongguancun Nandajie, Haidian District, Beijing 100081, P.R.China, Office telephone: 86-10-62179977. Fax: +t86 10 62173402.

E-mail addresses: gladiator1984@163.com (Y.-X. Guo), anjingang@126.com (J.-G. An).

<http://dx.doi.org/10.1016/j.bjoms.2016.06.023>

0266-4356/© 2016 The British Association of Oral and Maxillofacial Surgeons. Published by Elsevier Ltd. All rights reserved.

Case study and results

A 61-year-old man presented in November 2014 after 18 months of an infected swelling around his left mandibular molars, for which he had been given repeated antibiotics. He had had clear cell carcinoma of his right kidney 11 years before, for which he had had a right nephrectomy and had been given interferon chemotherapy postoperatively. Four years later he was diagnosed with distant metastases to his lung, right ribs, and lumbar region. He then had a course of chemotherapy and zoledronic acid intravenously once a month for five years, to control the bony metastases.

He developed an exposed sequestrum during the fifth year of the bisphosphonate treatment, for which his local dentist had prescribed antibiotics. When these did not work, he reported to our centre six months later and we treated him with a thorough local curettage. On follow up three months later we noticed a fracture of the left body of his mandible (Fig. 1, Supplement 1). We admitted him for a segmental mandibulectomy, where we used a titanium reconstruction plate to span the defect.

For this procedure, the osteotomy had to have a blood supply and healthy marrow at the cut edges, so that we could place the submandibular gland from the left side into the



Fig. 1. The left fracture of the mandibular body on the three-dimensional computed tomographic reconstruction.

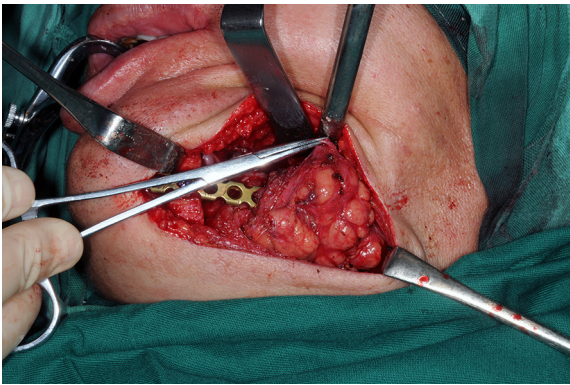


Fig. 2. The defect with the submandibular gland in place.

defect between the floor of the mouth and the reconstruction plate as a patch (Fig. 2, Supplement 2). We had to safeguard the capsule to prevent the formation of a fistula and so that the healing of the wound was not impaired. To protect the blood supply, we had to preserve the connection between the vascular pedicle (facial artery and vein) and the gland. Finally we completed primary closure of the soft tissues with tension-free, resorbable sutures.

At follow up 16 months later he was satisfied with his appearance and ability to chew (Fig. 3, Supplement 3-4).

Discussion

There is no consensus about the treatment of BRONJ. We think that resection is the best choice in advanced disease, as long as there is no secondary infection and the edges of bone have a fresh blood supply and healthy-looking marrow.⁴ However, bony reconstruction of segmental defects among patients with BRONJ can risk the transfer of malignant cells from the donor site, recurrence at resection margins, and non-union.⁵ Other authors have reported better outcomes with larger resections compared with limited debridement,

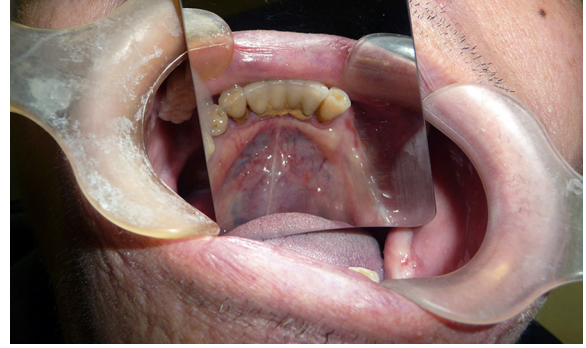


Fig. 3. The intraoral mucosal well-healed wound at 1.2 year review after operation.

or conservative treatment, or both.^{3, 6} A gap between the reconstruction plate and the floor of the mouth can form after a mandibulectomy (Supplement 2), because of inadequate coverage and long-term inflammation of the tissues. While other local flaps could be used to fill the defect, they are not as simple, safe, and well-vascularised as a submandibular gland.⁶ In patients with pre-existing conditions such as carcinoma, this is a less extensive procedure with predictable and favourable outcomes.

Conflict of interest

We have no conflicts of interest.

Ethics statement/confirmation of patient's permission

The work has been approved by the appropriate ethics committees of our hospital. We obtained the patient's permission for use of the material in this paper.

Number of IRB for this study

PKUSSIRB-201414057

Funding

There is no conflict of interest. The writing of the paper was supported by the Peking University School and Hospital of Stomatology (PKUSS20140103).

Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at <http://dx.doi.org/10.1016/j.bjoms.2016.06.023>.

References

1. Otto S, Tröltzsch M, Jambrovic V, et al. Tooth extraction in patients receiving oral or intravenous bisphosphonate administration: a trigger for BRONJ development? *J Craniomaxillofac Surg* 2015;**43**:847–54.
2. Yoshiga D, Nakamichi I, Yamashita Y, et al. Prognosis factors in the treatment of bisphosphonate-related osteonecrosis of the jaw - prognostic factors in the treatment of BRONJ. *J Clin Exp Dent* 2014;**6**:e22–8.
3. Engroff SL, Kim DD. Treating bisphosphonate osteonecrosis of the jaws: is there a role for resection and vascularized reconstruction? *J Oral Maxillofac Surg* 2007;**65**:2374–85.
4. Nocini PF, Saia G, Bettini G, et al. Vascularized fibula flap reconstruction of the mandible in bisphosphonate-related osteonecrosis. *Eur J Surg Oncol* 2009;**35**:373–9.
5. Seth R, Futran ND, Alam DS, et al. Outcomes of vascularized bone graft reconstruction of the mandible in bisphosphonate-related osteonecrosis of the jaws. *Laryngoscope* 2010;**120**:2165–71.
6. Westreich R, Meisner J, Reino A, et al. The use of combined Bernard-Webster and Karapandzic flaps for subtotal lower lip reconstruction. *Plast Reconstr Surg* 2008;**121**:e340–1.