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Horizontal alveolar transport distraction osteogenesis to stabilize removable prosthesis after mandibular reconstruction

KEYWORDS

Horizontal alveolar transport distraction osteogenesis;
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Reconstruction of maxillomandibular alveolar defects or atrophy is performed with various methods such as autologous onlay bone graft, guided bone regeneration, and alveolar distraction osteogenesis (DO).¹ In autologous bone graft, unpredictable resorption or graft failure for inadequate mucosal coverage may occur.¹ Alveolar DO can avoid donor site morbidity and is commonly applied as preimplant surgery.^{1–3} As an alternative method to vertical alveolar DO, horizontal alveolar DO has been also applied to bone defects after marginal mandibulectomy or inferior maxillectomy.^{1–3} Although some patients with alveolar defects prefer removable prosthesis for the high costs of dental implant treatment, removable prosthesis is often unstable, especially in edentulous jaws. Here, we reported horizontal alveolar transport DO to stabilize removable prosthesis after mandibular reconstruction.

A 78-year-old male with right mandibular gingival cancer underwent segmental mandibulectomy and mandibular reconstruction with the ilium and pectoralis major myocutaneous flap 7 years ago. Although a mandibular removable prosthesis has been used, missing and mobility of teeth as well as the mobile flap made the use difficult (Fig. 1A). Because the patient refused dental implant placement for high cost, we planned horizontal sliding transport DO of the alveolar segment to stabilize the removable prosthesis (Fig. 1B). Intraoral horizontal incision was made and the

mucoperiosteal flap was elevated. The planned alveolar osteotomy was performed following the temporary insertion of a distractor (KLS Martin, Tuttlingen, Germany). After the distractor was screwed back into the previous position and activate-deactivated to check that the device was working (Fig. 1C), the wound was closed. After a 7-day latency period, the distractor was activated at the rate of 0.5 mm per day for 26 days (Fig. 1D). After a 3-month consolidation period, the distractor was removed. Although the left central and lateral incisors were removed for periodontitis 6 months after the surgery, the removable prosthesis could be stable due to the alveolar distraction (Fig. E–G).

Alveolar DO can provide adequate height and width of the bone and extension of the attached gingiva by stretching bone fragments separated by osteotomies, as preimplant surgery.^{1,3} Vertical alveolar DO is generally performed for maxillomandibular alveolar augmentation,³ but the application is limited to the anterior maxilla and mandible for proximity to the maxillary sinus and mandibular canal. In contrast, horizontal alveolar DO is useful for the repair of anterior and posterior bone defects associated with tumors, cysts, traumata, clefts, and localized periodontitis.^{1–4} Dental implants are commonly placed on the extended bone after horizontal alveolar transport DO, and Uckan et al.¹ reported that the survival rate of 25 dental

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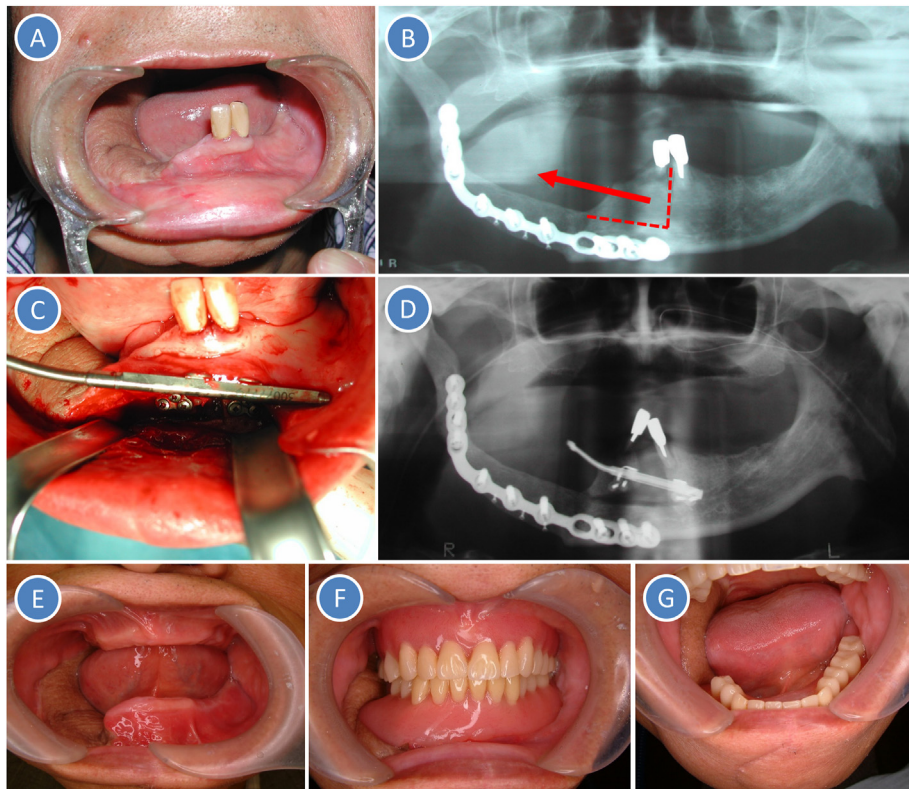


Figure 1 Intraoral photograph, and radiological images. (A) The intraoral view before surgery. (B) Panoramic radiograph after mandibular reconstruction. A borderline indicates planned osteotomy line. An arrow indicates distraction vector. (C) Installation of the distractor. (D) Panoramic radiograph after the completion of distraction. (E) Intraoral view 1 year after surgery (F and G) Intraoral view after installation of complete prostheses.

implants in 10 patients with 12 alveolar defects was 92% after 63 months of follow-up. In the present elderly patients who underwent segmental mandibulectomy and mandibular reconstruction with the ilium and pectoralis major myocutaneous flap, vertical DO of the ilium covered with the flap cannot provide an extension of the attached gingiva and further flap removal is required for the stable prosthesis. In contrast, horizontal alveolar transport DO could allow the stability of the removable prosthesis by extended alveolar bone.

Declaration of competing interest

The authors have no conflicts of interest relevant to this article.

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