



Prevention points for plate exposure in the mandibular reconstruction

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ABSTRACT

Introduction: The rate of complications for mandibular reconstruction after segmental mandibulectomy is higher with reconstruction plates than with vascularised bone grafts. We have experience of over 100 patients using reconstructive plates for reconstruction immediately after segmental mandibulectomy and have considered factors contributing to plate exposure.

Patients and methods: Seventeen cases utilised our prevention methods in which reconstructive plates were used for mandibular reconstruction were reviewed. The flaps used with reconstruction plates were rectus abdominis myocutaneous flaps in 10 cases, anterolateral thigh flaps combined vastus lateralis muscle in four cases, and the omentum in one case; no flap was transferred in two cases.

Results: In only one of 17 cases was a plate exposed at 3 months postoperatively. No plate exposure occurred during the follow-up period in the other 16 cases. Because no flap had been transferred in the patient with plate exposure, a possible contributing factor was the persistence of dead space beneath the plate.

Conclusion: This series suggests that factors other than flap selection contribute to the exposure of reconstructive plates. Use of a reconstruction plate is a useful reconstructive method, especially for patients who cannot tolerate transfer of a vascularised bone graft.

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1. Introduction

The method of mandibular reconstruction after segmental mandibulectomy, such as vascularised osseo-cutaneous flap transfer (Hidalgo and Rekow, 1995; Santamaria et al., 1998), combined double-flap transfer (Wei et al., 2002; Koshima et al., 1989), and the combination of reconstruction plate and soft-tissue transfer (Cordeiro and Hidalgo, 1994; Blackwell et al., 1996; Boyd et al., 1995) is chosen on the basis of various factors, including the extent of resection, patient age, the patient's general condition, and the number of remaining teeth. Among the sources of vascularised bone, the most often used are fibula (Lopez-Arcas et al., 2010; Kerrary et al., 2011; Gonzales-Garcia et al., 2011), scapula (Swartz et al., 1986), and iliac crest (Daniel, 1988). Long-

term outcomes after lower mandible reconstruction have been extensively studied (Irish et al., 1995; Urken et al., 1998; Li et al., 2007). However, the use of reconstruction plates for mandibular reconstruction is often criticized because reported rates of post-operative plate exposure have been extremely high (Wei et al., 2003; Okura et al., 2008) such as the 46.15% reported by Wei et al. However, patients with a poor prognosis, such as elderly patients and patients with recurrent tumours, might not be able to tolerate long, complicated reconstructive procedures, such as transfer of a vascularised bone graft. Exposure is the most serious complication of plate reconstruction and necessitates a fundamental review of the therapeutic plan, including plate removal. Ischaemia in the flap and the extent of mandibular resection has been suggested to contribute to plate exposure, but whether they do is unclear. Hundred patients in whom reconstructive plates (Ettl et al., 2010) were used for reconstruction immediately after segmental mandibulectomy at the National Cancer Center Hospital or the Okayama University Hospital over the past 10 years were reviewed. We considered the factors contributing to plate exposure and prevention points from our experience. As a result, we perform rigid reconstruction using a reconstruction plate for the group of

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poor preoperative state and produce good outcomes for postoperative plate exposure. We report the prevention points of plate exposure and results of recent cases.

2. Patients and methods

We reviewed 17 cases of mandibular reconstruction with reconstruction plates after segmental mandibulectomy at the Okayama University Hospital from January 2005 through September 2009. The use of plate reconstruction in our institution were poor prognosis cases in the elderly (mainly, over 70 years old) overall status, severe cases of poor prognosis for the stage of the tumour and cases not expecting the insertion of implants in the future. The patients were seven men and 10 women aged 41–81 years (median age, 64.1 years). The pathological diagnosis was squamous cell carcinoma in 15 cases (88.2%), chondrosarcoma of the mandible in one case (5.9%), and osteoradionecrosis of the mandible in one case (5.9%). The site of the primary tumour was the gingiva/mandible in 15 cases (88.8%), the floor of the mouth in one case (5.9%), and the tongue in one case (5.9%). The extent of the mandibular bone defect was classified according the hemimandible, central, and lateral (HCL) method of Jewer et al. (1989) (Fig. 1). The types of bone defect were H in eight cases (47.1%), LC in three cases (17.7%), and L, HC, and LCL in two cases each (11.8%) (Fig. 2). The flaps used with the plate for mandibular reconstruction were rectus abdominis myocutaneous flaps in 10 cases (58.8%), anterolateral thigh flaps with vastus lateralis muscle in four cases (23.6%), and the omentum in one case (5.9%); no flap was transferred in two cases (11.8%) (Table 1). Radiation therapy was preoperative in four patients (23.6%), postoperative in three patients (17.7%), and was not administered in 10 patients (58.8%). There were no cases of plate fracture during the follow-up period. The follow-up period ranged from 1 year to 5 years 2 months (median, 26 months).

3. Results

Of the flaps transferred with reconstructive plates all but one survived completely. However, the single omentum transferred underwent partial necrosis owing to compression. The area of necrosis was surgically debrided, and the remaining part of the transferred omentum survived.

By 3 months postoperatively a reconstruction plate had become exposed in only one of 17 cases (5.9%). The exposed plate was removed 11 months after reconstructive surgery. However, no plate exposure or plate damage occurred during the follow-up period in the other 16 cases (94.1%).

Postoperative complications in the head and neck region were cervical skin necrosis in one case, cervical abscess in one case, and surgical site infection in two cases. In the patient with skin necrosis, an additional operation was performed for skin grafting. The other complications were treated conservatively. Abdominal and femoral flap-donor sites showed delayed healing in one case each but ultimately healed with conservative management. Four patients (23.6%) died of tumour recurrence during the follow-up period, and two patients (11.8%) were alive with disease (Table 2).

3.1. Representative cases

3.1.1. Case 1

Patient 13 was 50-year-old woman with recurrent cancer of the mandibular mucosa. The primary operation, comprising segmental mandibulectomy, right-sided neck dissection, and transfer of vascularised fibular bone graft, had been performed approximately 2 years earlier. Ablative surgery for the recurrent tumour was performed with segmental mandibulectomy and left-sided neck dissection. Reconstructive surgery involved transfer of a free rectus abdominis myocutaneous flap and a reconstruction plate. In this

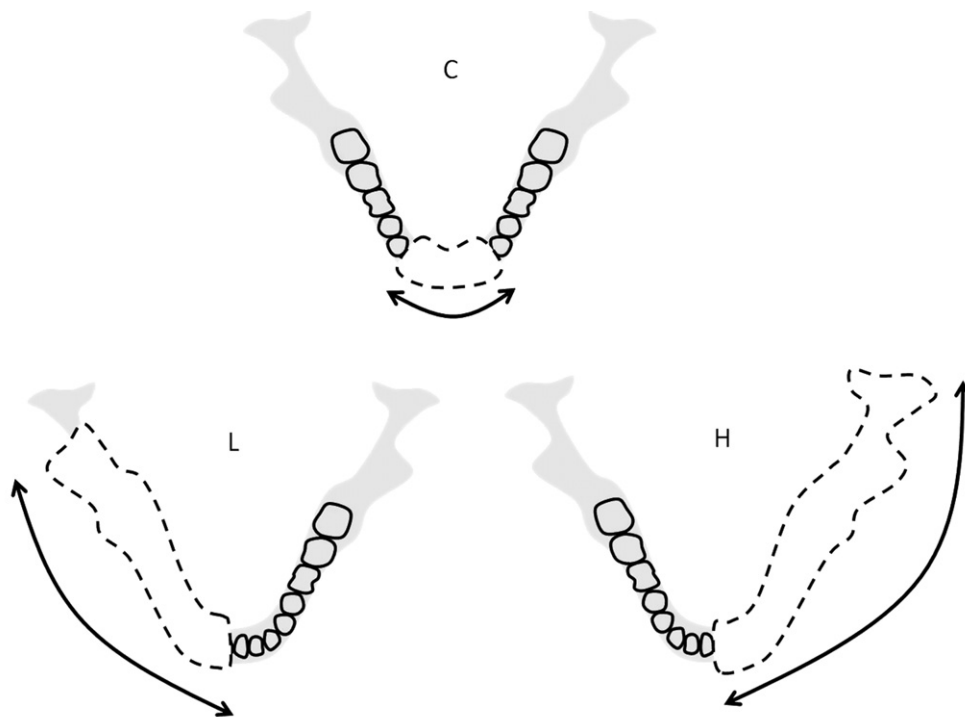


Fig. 1. Basis of the HCL method for classifying mandibular defects. “C” indicates a defect involving the entire central segment including both lower canines. “L” indicates a lateral segment defect that does not include the condyle. “H” indicates a lateral segment defect that includes the condyle. Both L defects and H defects can be of variable length but do not significantly cross the midline.

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