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Effect of concurrent mental nerve reconstruction at the same time as mandibular reconstruction using a fibula osteoseptocutaneous flap

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Summary The damage of inferior alveolar nerve causes some functional problem including numbness of lower lip and drooling. During segmental mandibulectomy, inferior alveolar nerve commonly resected, therefore, it is ideal to reconstruct the nerve to get better functional result. Sensory recovery was assessed after mandibular reconstruction using free fibula osteoseptocutaneous flap in thirteen cases. In six cases, the mental nerve reconstruction was performed simultaneously, and in seven cases, the mental nerve reconstruction was not performed. In the case that the mental nerve was reconstructed simultaneously, unilateral mental nerve reconstruction was performed in five cases, and bilateral mental nerve reconstruction was performed in one cases. More than one year after the reconstruction, sensory recovery was assessed and compared between the group that the mental nerve was reconstructed and the group that was not reconstructed. Our results showed almost a normal sensory recovery of the lips on the reconstructed side more than one year after the reconstruction in reconstructed group. In contrast, sensory recovery was poor in non-reconstructed group and non-reconstructed side. These results showed that mental nerve reconstruction at the same time as mandibular reconstruction affects the postoperative mandibular function. The sural nerve can be harvested from the same donor site of the free fibula osteoseptocutaneous flap and such mental nerve reconstruction with nerve grafting can be completed within an hour. Most cases of mandibular reconstruction using a free fibula

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osteoseptocutaneous flap transfer can therefore be candidates for mental nerve reconstruction at the time of mandibular reconstruction.

Introduction

A sensory disturbance of the lip causes numerous functional difficulties including drooling and oral incompetence.[1] Segmental mandibulectomy for oral cancer often causes numbness of the lip due to resection of the inferior alveolar nerve during tumor excision. Some authors have reported the utility of inferior alveolar nerve reconstruction after trauma and nerve injury which occurs during sagittal mandibulectomy, and they showed excellent results.[2–4] However, few reports have so far shown the utility of mental nerve reconstruction during mandibular reconstruction with a free fibula osteoseptocutaneous flap.[5] The fibula osteoseptocutaneous flap has numerous advantages for mandibular reconstruction.[5] In addition, the sural nerve can be harvested for nerve grafting during fibula osteoseptocutaneous flap elevation from its donor site. However, its utility has so far only rarely been discussed. This report presents six cases in which the mental nerve was reconstructed during mandibular reconstruction using a free fibula osteoseptocutaneous flap.

Patients and methods

In thirteen cases undergoing mandibular reconstruction using a free fibula osteoseptocutaneous flap, the sensory recovery was assessed more than one year after the reconstruction. In six cases with a mandibular defect, mental nerve reconstruction was performed during mandibular reconstruction (Group 1). In the other seven cases, mental nerve reconstruction was not performed (Group 2). In three cases from Group 1, the bilateral mental nerves were excised. In two of these three cases, unilateral mental nerve reconstruction was performed. In one of these three cases bilateral mental nerve reconstruction was performed. In three cases from Group 1, the unilateral mental nerve was excised and mental nerve reconstruction using nerve grafting was performed (Table 1).

At the operation, the sural nerve was harvested from the flap donor site, and it was then used for mental nerve reconstruction. The inferior alveolar nerve was detected before the entrance of the mandibular foramen, and the mental nerve was detected at the mental foramen. A reversed nerve graft of the sural nerve was placed between the distal stamp of the inferior alveolar nerve and the proximal stamp of the mental nerve. The nerve suture was performed using epi-neural sutures in an end-to-end fashion with 10-0 nylon (Figure 1).

Sensory recovery assessment was performed by a single examiner with the patients' eyes closed more than one year after the sensory reconstruction had been performed. The Semmes–Weinstein long kit was used to evaluate the sensibility of the lateral quarter of the lower vermilion border on both sides. If the patient could detect the filament marking 1.65–2.83, it was scored as 5. If the patient could detect 3.22–3.61, then it was scored as 4. If the patient could detect 3.84–4.31, it was scored as 3. If the patient could detect 4.56–6.65, it was scored as 2. If the patient could not detect the filament at all, it was scored as 1. All patients were asked to comment on any drooling from each side of the mouth angle. If the patient always experienced some drooling, it is recognized as grade 1. If the patient experienced drooling sometimes, it was recognized as grade 2. If the patient would control their drooling when they are careful about it, it was recognized as grade 3. If the patient never experienced drooling, it was recognized as grade 4. The detail of our patients are summarized in Tables 1 and 2.

Statistical analysis

Any correlations and statistical difference between the extent of drooling and the reconstruction of the mental nerve were assessed by the unpaired t-test. A statistical analysis was performed using the Graph Pad Prism 4 software program (Graphpad software, San Diego). A significant difference was considered to exist with a P value of less than 0.05.

Results

The results of the Semmes–Weinstein Monofilament test and the extent of drooling are summarized in Tables 1 and 2. These results showed a significant difference in the sensory recovery between Group 1 and Group 2. All patients in Group 1 exhibited a return of sensation on the side where the mental nerve had been reconstructed, and the results of Semmes–Weinstein Monofilament test showed an average score of 4.33 ± 1.21 (Table 1). In contrast, the patients in Group 2 showed a poor sensory recovery, and the results of Semmes–Weinstein Monofilament test showed an average score of 1.42 ± 0.53 (Table 2). A significant difference regarding the Semmes–Weinstein Test score was thus observed between these two groups (Figure 2). In Group 1, the extent of drooling was about 3.33 ± 0.81, while in Group 2, the score was 1.86 ± 0.69. A significant difference regarding the extent of drooling could thus be seen when comparing these two groups (Figure 3). Two patients in whom bilateral mental nerve was excised and unilateral mental nerve reconstruction was performed (cases 1 and 2 in Table 1), often experienced drooling from the side without reconstruction. However, they never