



Total and near-total lower lip reconstruction: 20 years experience



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ABSTRACT

Background: Reconstruction of total and near-total lower lip defects presents a formidable challenge for the reconstructive plastic surgeon. Many methods have been described, and each has its own advantages and disadvantages. The aim of this article is to discuss the selection of techniques and report our experience of total or near-total lower lip reconstruction.

Material and methods: Over a 20-year period from January 1993 to December 2013, a total of 87 patients underwent total or near-total lower lip reconstruction. Bilateral Yu's flaps were used in 61 patients, double mental neurovascular V–Y island advancement flaps in 16 patients, bilateral Mutaf's techniques in 4 patients, and reconstruction with free radial forearm flaps in 6 other patients. Drooling Rating Scale (DRS) and Patient and Observer Scar Assessment Scale (POSAS) were used to evaluate oral competency and esthetic outcomes.

Results: All patients underwent single-stage total or near-total lower lip reconstruction successfully. There were no flap failures. Only 1 patient who accepted the bilateral Yu's flaps developed microstomia, having difficulty in wearing her dentures postoperatively. Oral competencies were well preserved in other patients, and esthetic results were satisfactory.

Conclusion: Based on our experience, we recommend using the bilateral local techniques or free flap introduced in this article, according to the extent of defects and the patient's general condition, to achieve a personalized ideal reconstruction of the lower lip.

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1. Introduction

Total and near-total lower lip defects may result from tumor resection, trauma, or congenital factors. Although more than 200 methods have been described in the reconstruction of lip defects since 1000 BC, none of them can balance oral competence and cosmetic outcomes simultaneously in the reconstruction of all such defects.

Total lower lip defects usually involve the full-thickness tissue of lower lip including skin, vermilion, orbicularis oris muscle, buccal mucosa, and even angulus oris. One-stage reconstruction of such

complex defects is still a rigorous challenge to the reconstructive plastic surgeon. In a total or near-total lower lip reconstruction, the main goal is to reconstruct a functionally and cosmetically acceptable lower lip with an adequate sphincter function including articulation, speech, and mastication. The authors' refinements of bilateral musculocutaneous local flaps or free radial forearm–palmaris longus tendon flap meet these criteria in a single stage.

Numerous techniques have been considered to be ideal for reconstruction of total or near-total lower lip. Nevertheless, there is no consensus regarding which technique is the best. The aim of this article is to discuss the selection of techniques and to report our experience of total or near-total lower lip reconstruction.

2. Material and methods

From January 1993 to December 2013, a total of 87 patients who underwent reconstruction of total or near-total lower lip were

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included in our study at the Department of Oromaxillofacial–Head and Neck Surgery, Department of Oral and Maxillofacial Surgery, School of Stomatology, China Medical University. Informed consent was obtained from all patients involved in the study, and approval was obtained from the ethics committee.

Of the 87 patients, 54 were male and 33 female. Their ages ranged from 33 to 83 years. In all, 79 patients (90%) had squamous cell carcinoma (SCC), 4 (6%) had basal cell carcinoma (BCC), 2 (2%) had adenoid cystic carcinoma (ACC), and 2 (2%) had malignant melanoma. After excision of the tumor, 14 patients had defects involving more than four-fifths of the lower lip but not the entire lip. In 64 patients, the defect include the entire lower lip, whereas in the remaining 9 patients there was a larger defect extending beyond the oral commissures and the mental region. According to the degree of relaxation of the cheek skin, different reconstructive procedures were performed. Bilateral Yu's flaps were used in 61 patients, double mental neurovascular V–Y island advancement flaps in 16 patients, bilateral Mutaf's techniques in 4 patients, and reconstruction with free radial forearm flaps in 6 other patients. The total lower lip reconstructions were combined with bilateral supraomohyoid lymph node dissection in 10 patients. Once the invasion of lymph nodes in the neck was confirmed, we would perform the neck dissection. No prophylactic neck dissections were done. Nasogastric tube feeding was carried out postoperatively for 1 week.

A total of 55 patients went through the Drooling Rating Scale (DRS) (Marks et al., 2001) 3–6 months postoperatively. That questionnaire aims to assess a patient's severity of drooling during daily activities such as standing, sitting, lying down, eating, and talking.¹ The patient's drooling severity was classified as mild (0–5 scores), moderate (6–10 scores) or severe (11–15 scores).

For esthetic assessment, 46 patient and 2 individual observers (Shuang Bai, Chang-Fu Sun) went through the Patient and Observer Scar Assessment Scale (POSAS) (Van der Kar et al., 2005) 1 month postoperatively.

On this 10-point scale, a low score means a better scar quality, and a high score reflects a worse scar. The accumulated score describes an overall scar quality.

3. Results

All patients underwent 1-stage total or near-total lower lip reconstruction successfully and none needed a second stage for flap division and inset. The follow-up ranged from 6 months to 5 years, with 5 patients lost to follow up.

In all, 73 patients had total lower lip reconstruction and 14 patients accepted near-total lower lip reconstruction (> 4/5 lower lip). Lip defect sizes ranged from 6.0 × 1.5 cm to 8.0 × 2.5 cm. No flap failure was seen, and desirable function and esthetic results were obtained. The flap survival was 100%, and healing was eventful in all cases. One patient (83 years old) who accepted the bilateral Yu's flaps developed microstomia, having difficulty in wearing her denture postoperatively. Another complication involved local infection, which healed with drainage and systemic antibiotic therapy. All patients were discharged without a feeding tube, and carried out daily oral hygiene with no difficulty by 2 weeks after the operation.

A total of 55 patients accomplished the oral competency assessment with the DRS (Table 1). Four-fifths of the patients had no drooling or mild drooling problems. The other patients experienced moderate severity of drooling, and 2 patients had severe drooling.

Esthetic outcomes were assessed in 46 patients by POSAS. In the observers' assessment (Table 2), the score of each item ranged from 1 to 5, indicating scars that almost resembled normal skin. In the

Table 1
Results of drooling rating scale.

	Bilateral Yu's flaps (31)	Bilateral V–Y flaps (15)	Bilateral Mutaf's techniques (4)	Free radial forearm flap (5)
Total scores^a	3.68 ± 2.37	2.93 ± 1.62	4.00 ± 1.41	7.40 ± 3.65

^a Mean ± standard deviation.

patients' assessments (Table 3), the results were also satisfactory. We performed bilateral Mutaf's techniques on 4 patients in our department. With the exception of 1 patient whose scar contracted at the midline after accepting bilateral Mutaf's flaps, all other patients were satisfied with their esthetic results.

The 10 patients who accepted bilateral supraomohyoid lymph node dissection all have not experienced recurrence or metastasis during long-term follow-up.

3.1. Surgical technique

3.1.1. Bilateral Yu's flap surgical technique

The classic Yu's design was performed after a heart-shaped excision of the tumor. The medial two-thirds of the orbicularis oris muscle was cut down at the commissure, whereas the lateral part was kept intact to maintain the sphincteric function of oral cavity. In the classic Yu's design, the triangular skin that is adjacent to the commissure should be excised. Given the limited mucosal tissue volume provided from the Yu's design, we strongly initiated an effort to preserve the skin of this area to achieve a desired level of vermilion fullness.

3.1.2. Composite radial forearm–palmaris longus tendon flap technique

The composite radial forearm–palmaris longus tendon flap, of which dimensions and shape were tailored to the size of oral mucosa and chin defect, was harvested from the distal one-third of the forearm. Accompanied with the radial forearm flap, the palmaris longus tendon was cautiously harvested. The flap was then folded over the palmaris longus tendon to form the lip margin. The labiogingival sulcus was recreated with water-tight suture line. Through the bilateral modiolus, we created bilateral intramuscular tunnels using blunt separation and anchored both ends of palmaris longus tendon to the remaining orbicularis muscle of the upper lip. The tension of tendon suture was adjusted to the normal coverage of the lower gingival to form an appropriate oral vestibule. Donor site closure was obtained by split skin grafting.

Two other techniques used in our department were done according to the classical design.

3.2. Case presentation

3.2.1. Case presentation 1

A 68-year-old man with T3N0M0 squamous cell carcinoma of the right lower lip underwent wide excision of a tumor. The resulting defect involved the near-total lower lip and a 7 × 3 cm area of the chin in full thickness (Fig. 1). Bilateral Yu's flaps were designed and elevated as described (Fig. 2). The postoperative course was uneventful, without serious complications. Two months later, esthetic and functional outcomes were satisfactory (Fig. 3).

3.2.2. Case presentation 2

A 38-year-old man with a 1–pack-day history of cigarette smoking presented with a stage T3N0M0 adenoid cystic carcinoma of the lower lip. A wide local excision and unilateral selective neck dissection were performed (Fig. 4). A composite radical

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