

Clinical Paper
Reconstructive Surgery

Microsurgical free flap reconstructions of the head and neck region: Shanghai experience of 34 years and 4640 flaps

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Abstract. This study represents the surgical experience of 4481 microvascular free flap cases performed at the authors' institution in China, between 1979 and 2013. Four thousand four hundred and eighty-one patients underwent reconstruction with 4640 flaps: 56% radial forearm flaps, 8% iliac crest flaps, 13% fibula flaps, 10% anterolateral thigh flaps, and other flaps. In the overwhelming majority of cases, the flap transfer was required following tumour resection (97.5%). Three hundred and twenty minor complications (6.9%) occurred. One hundred and eighteen major complications (2.5%) were encountered: 114 cases of failure (2.4%) and four deaths. Among the 118 cases with major complications, 26 – 22.0% – had received radiotherapy; this proportion was higher than the 6.9% in the minor complications group and 8.1% in the non-intervention group. Venous thrombosis was the most common complication at the recipient site and was the main cause of flap failure. When a compromised flap is identified, surgical re-exploration should not be delayed. This study confirms that free flaps are reliable in achieving successful reconstruction in the head and neck region; however this technique requires extensive clinical experience. Owing to the large number of flap options, microsurgeons should always pay attention to the details of the different surgical defects and choose the most appropriate flap.

Key words: oral cancer; defect; microsurgery; free flap; clinical experience.

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In the oral and maxillofacial region, microsurgical free flap transfer is often necessary to cover extensive defects after tumour resection or severe trauma,

to maintain good oral function and facial symmetry. Microsurgery requires extensive anatomical knowledge and an experienced surgical team, coupled with a

vigilant and dedicated postoperative care team. However, for most centres this type of surgery still represents an extraordinary challenge.

In 1959, Seidenberg et al. described the first free flap transfer, which was a jejunum flap used to cover an oesophageal defect.¹ Taylor et al. described fibula free flap transfer as the first microsurgical bone graft and since then it has gained tremendous popularity for reconstruction of the mandible and maxilla.² Another important milestone was the first description of the vascularized radial forearm free flap (RFFF) by Yang et al. at the PLA Shenyang General Hospital in 1979³; this has undoubtedly played a significant role in soft tissue reconstruction in the head and neck region.

The RFFF was used extensively in China before the year 2007. The advantage of the RFFF is that it is thin, pliable, and offers a reliable and long pedicle with a suitable diameter, thereby allowing it to be used for the majority of both intraoral and extraoral defects. However, disadvantages include its thin nature, which limits its use when applied to large defects of the tongue and composite defects, and donor site scarring. As a result, the use of the anterolateral thigh flap (ALTF) has become more and more widespread.

The main options for mandible and maxilla reconstruction are the fibula free flap, iliac free flap (deep circumflex iliac artery (DCIA) flap), and scapula free flap. These flaps have their respective advantages and disadvantages. The choice for mandible and maxilla reconstruction is dependent on the defect type.

The Shanghai Ninth People's Hospital is the largest oral and maxillofacial and head and neck cancer centre in China, treating approximately 1500 oral cancer cases each year, with the majority of these cases requiring reconstruction. About 30% of these cases need a free flap reconstruction for large defects. In 2008, our department reported an advanced staged oral cancer case requiring reconstruction of an extensive oral and maxillofacial defect. This patient underwent reconstruction with three flaps – a fibula flap, latissimus dorsi flap, and pectoralis major myocutaneous flap – to reconstruct the floor of the mouth, neck skin, and mandible (Figs. 1–5).⁴

The purpose of this research was to report and analyze the incidence of the use of free flaps and the success and failure rates of free flap tissue transfer in the oral and maxillofacial region over the last 34 years at the Shanghai Ninth People's Hospital.

Materials and methods

In this retrospective analysis, we investigated 4481 patients undergoing a total of 4640 microsurgical reconstructions, which were conducted in the Surgical Oncology Ward of the Department of Oral and Maxillofacial Surgery (from 1979 to 2012) and Department of Oral and Maxillofacial – Head and Neck Oncology (2012–2013) of the Ninth People's Hospital Affiliated to Shanghai Jiaotong University School of Medicine. Cases with complete records,

including demographic, clinical, and surgical data, were included. In addition to the systematic record research, documents from the in-hospital patient administration system were used for data acquisition for the period 2007–2013. However, as patient records were handwritten between 1979 and 2006, some clinical data were lost due to faded handwriting.

The patients ranged in age from 2 to 91 years, with a mean age of 58.6 years; 2754 were males and 1727 were females. The medical records and details of the primary tumour site, flap type, management of the jaw, vessels from the donor site, vessels at the recipient site, and complications were analyzed. The free flaps selected for reconstruction are listed in Table 1. Of the reconstructions performed, 8.3% were carried out in patients after chemotherapy, 8.5% after radiotherapy, and 4.4% after chemoradiotherapy. Primary maxilla–mandible reconstructions were performed in cases with benign tumours and malignant tumours with a low risk of recurrence.

The recipient vessels were divided into two groups, a conventional group and an unconventional group. The recipient vessels included the facial artery, common facial vein, external jugular vein, and superior thyroid artery.

Complications after microsurgery were divided into major and minor complications. Major complications included flap and donor site complications for which

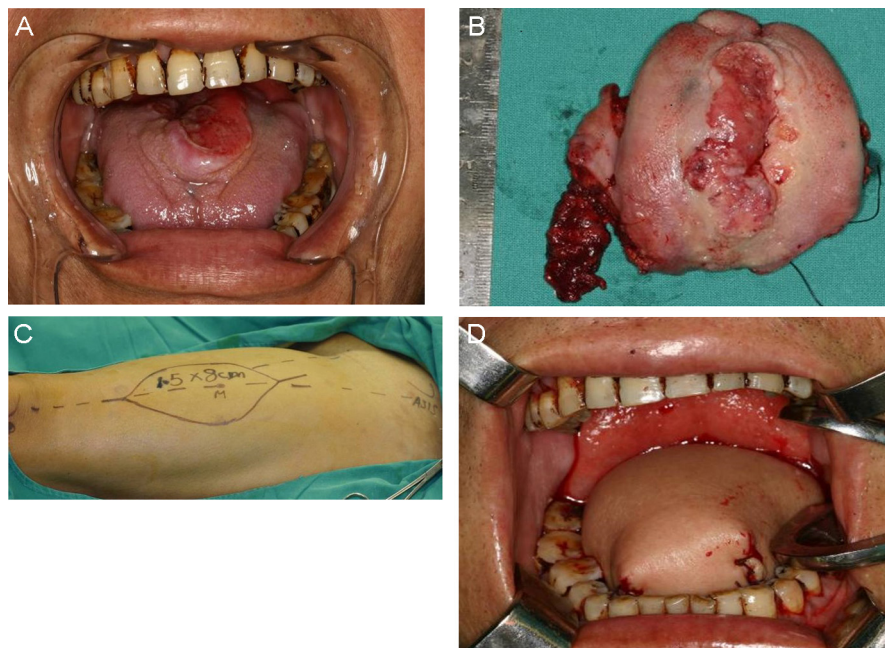


Fig. 1. The case of a 63-year-old male patient who underwent tongue reconstruction with an anterolateral thigh flap (ALTF) because of squamous cell carcinoma in the dorsum of the tongue. (a) T4a cancer in the dorsum; (B) total glossectomy; (C) harvest of the 5 cm × 8 cm ALTF flap; (D) bulky reconstruction of the tongue.

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