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Further experience with adipofascial ALT flap for oral cavity reconstruction

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Summary *Background:* The restoration of the buccal mucosa is the main challenge for the plastic surgeon. In the past 15 years the free radial forearm flap has been widely used, due to its thickness and pliability. More recently, the anterolateral thigh free flap has become the customary flap in oral cavity reconstruction.
Methods: Six patients affected by oral cavity tumours underwent microsurgical reconstruction with the adipofascial anterolateral thigh free flap between December 2005 and December 2006.
Results: One flap was lost due to venous thrombosis. In the other five flaps the postoperative period was uneventful. The patients are still free from disease. Multiple biopsies were performed to compare the neo-mucosa with the native. No relevant differences have emerged.
Conclusions: Replacing tissue with like tissue should be the surgeon's aim. In the authors' opinion, the adipofascial variation of the anterolateral thigh free flap is the ideal replacement for oral cavity mucosa, allowing good fixation and mobility, and optimum aesthetic and functional results. It can be thinned to fit the defect with low risk. The patching condition resulting from fasciocutaneous flaps reconstruction is avoided. The remucosalisation of the flap occurs in about 1 month for the neo-mucosal functions as it does in the native tissue. It is non-hair bearing and is not influenced by postoperative radiotherapy.

Reconstruction of the oral cavity mucosa is necessary after oncological resection of buccal malignancies. The buccal mucosa is loose and mobile and contains intrinsic salivary glands, which continuously secrete saliva to keep the mouth moist. In the 1940s and 1950s, intraoral wound closure was performed by skin or mucosa grafts as described by McGregor.[1] In the 1960s, pedicled flaps as nasolabial flap, tongue flap, transbuccal flap, deltopectoral flap and pectoral flap were introduced for oral cavity reconstruction.[2,3] Twenty years later, the pectoralis major musculocutaneous flap and free dorsalis pedis came into use.[4,5] Since 1983, when Soutar reported a successful free radial forearm

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flap for oral cavity defects, free flaps have become popular.[6] Since then, different free flaps have been harvested to achieve primary functional and aesthetic reconstitution after oral cavity cancer resection. The main disadvantages of all skin flaps are that they do not replace tissue with like tissue in oral cavity restoration. Indeed, lubrication is not provided and hairs are present on the skin paddles.[7] Furthermore, there is a need to replace the thin oral lining with a thinner flap, and this is the reason for the success of radial forearm free flap in oral cavity reconstruction. Nevertheless, the forearm flap does not guarantee a stable functional outcome since it loses its initial volume and shape; volume reduction and flap falling lead to the loss of the hyoid arch that inclines towards the reconstructed side, thus altering the propulsive proprieties of pharynx with bolus stasis and increased risk of aspiration. The remucosalisation of fasciocutaneous flaps in oral cavity reconstruction has been described previously.[8–10]

The adipofascial anterolateral thigh free flap allows better functional and aesthetic results, thanks to the strong and thick fascia lata as compared to other flaps.

Patients and methods

Between December 2005 and December 2006, six patients underwent microsurgical reconstruction of oral cavity soft tissue defects following oral cavity cancer resection. Five patients were male and one female, with an average age of 63 years (ranging from 50 to 77). All patients were affected by squamous cell carcinoma of the oral cavity and underwent neck dissection simultaneously. An adipofascial anterolateral thigh free flap was used in all patients. Patients received liquid food through the percutaneous endoscopic gastrostomy (PEG) during the first few days and generally up to a week after the operation, and then were gradually started on a soft diet and then followed by solid diet according to the patients' condition and the opinion of the supervising nurses and physiotherapists until the PEG was removed.

Postoperative radiotherapy in fractioned doses ranging from 5000 to 8000 cGy was followed in all cases. The initial size of the flaps ranged from 6 to 9 cm in width and from 10 to 16 cm in length; all the flaps were turned into adipofascial flaps, and thinning and shaping procedures were performed every time. The mean postoperative follow-up period was 28.8 months (ranging from 7 to 89 months). The median operative time, including tumour resection, neck dissection and reconstruction, was 7 h and 40 min (ranging from 6.5 to 9.5 h). The mean hospitalisation period was 18.8 days (ranging from 14 to 25 days) without any medical complication.

All surgical procedures were carried out using a 'two-team' approach. Patient age, gender, tumour stage, flap dimensions, complications and follow-up are listed in Table 1.

Surgical technique

Tumour resections along with neck dissection were performed simultaneously on all patients. The shape of the flap was elliptical to allow an easier closure of the donor site. Fasciocutaneous anterolateral thigh free flap was harvested, with particular attention paid to obtain eccentric access of the vascular pedicle in the deep fascia. The anterolateral thigh flap was elevated as a fasciocutaneous flap and then turned into an adipofascial flap before the vascular pedicle's section. The skin was excised, and the fat was trimmed to fit the defect. This procedure initially allowed for a careful haemostasis of soft tissue. Subsequently, a standard closure of the donor site was possible; indeed if the adipofascial flap was directly harvested, a postoperative collapsed scar would result on the thigh. Consider also that the excised dermal thickness could be useful to fit and fill an underestimated defect in the receiving site.

Since a nonextendible anatomic structure, such as the deep fascia, is used to obtain an easier and stable anchoring, care must be taken to dissect more fascia than soft tissue to maintain oral cavity mobility and dynamism. The flap was sutured in a reverse fashion with the fascial surface outwards; the eccentric vascular pedicle allows good protection under subcutaneous tunnel towards the neck and avoids any contact with saliva (Figure 1). Technically, the deep fascia was sutured to the level of the lamina propria of the native mucosa, thus favouring mucosa advancement. The microvascular anastomoses were carried out before the complete flap inset to reduce the ischemia time.

Results

The free flap success rate was 83.3% (5 out of 6) and the postoperative period was uneventful in the remaining cases

Table 1 Patients' data

Patient	Age	Tumor site	Tumor stage (TNM)	Flap size (cm)	Fascia lata (cm)	Complication	Diet	Postop. radiotheraphy	Follow-up (months)
1	50	Mobile tongue	T3N2M0	10 × 6	13 × 9	No	Soft	Yes	85
2	75	Mobile tongue	T2N1M0	11 × 6	13 × 8	No	Soft	Yes	19
3	60	Retromolar trigone	T3N2M0	10 × 5	13 × 7	No	Liquid-soft	Yes	15
4	55	Floor of the mouth	T2N1M0	14 × 6	15 × 8	Orocutaneous fistula	Soft	Yes	21
5	77	Mouth floor	T3N2M0	15 × 7	16 × 8	No	Liquid-soft	Yes	3
6	63	Cheek	T3N2M0	10 × 6	13 × 6	Flap loss	Soft	Yes	6