

Modern Oral Cavity Reconstruction with Free Flaps and Pedicled Flaps

Alberto Deganello

Department of Surgery and Translational Medicine, AOU-Careggi, largo Brambilla 10, 50134 Florence, Italy

Received: Oct 15, 2015; **Accepted:** Oct 15, 2015; **Published:** Oct 25, 2015

Editorial

Head and neck reconstructive surgery is a challenging discipline since it deals with a region throughout which the patient breathes, speaks, swallows and has the self representation when looking at the mirror.

Small defects resulting from tumor ablation can be successfully managed with primary closure (i.e., limited excisions within the oral cavity), sometimes can be left to heal for secondary intention (transoral oropharyngeal/laryngeal/hypopharyngeal resections) or can be resurfaced using skin grafts or small local flaps, but in the majority of the cases the resulting defect requires a flap transposition in order to attempt a restoration of form and function and to ensure rapid and adequate wound healing. Therefore the anticipation of the resulting defect prior to surgery is crucial in order to propose the most pertinent reconstructive solution, in this light every head and neck defect should be evaluated in terms of lack of support, cover and lining, and the chosen flap should ideally approximate the resected tissues in terms of type, thickness, texture, mobility, sensation and function. Another important aspect to consider is the need to restore a separation between different compartments; in fact the surgical approach for tumor resection can often create an iatrogenic communication between the upper aerodigestive tract and neck contents, or between oral cavity and nasal/sinonasal cavities, orbital and cranial contents.

The introduction of microvascular reconstructions has provided the head and neck surgeon with the possibility of choosing among a broad variety of free flaps [1-5]. This reconstructive method represents a major evolution in the management of head and neck cancer with a consequent limitation of pedicled flap reconstructions. Unfortunately not every patient is an ideal candidate for a microvascular reconstructive procedure and it is also true that not every defect strictly requires a free flap transfer to achieve good functional results [6]. Nowadays the head and neck surgeon is more and more dealing with elderly patients suffering from severe comorbidities [7], with pre-treated patients presenting with a persistent/recurrent disease requiring salvage surgery, or with patients developing second primary tumors [8,9].

In these circumstances free flap surgery, with its prolonged anesthesia times and with the need of finding adequate recipient vessels in previously operated and radiated necks may rise serious concerns [6,10]. The surgeon, therefore, must not be extravagant in the application of advanced reconstructive techniques and

Corresponding author: Alberto Deganello

✉ adeganello@hotmail.com

Department of Surgery and Translational Medicine, AOU-Careggi, largo Brambilla 10, 50134 Florence, Italy.

Tel: 055.7947054

Citation: Deganello A. Modern Oral Cavity Reconstruction with Free Flaps and Pedicled Flaps. *J Aesthet Reconstr Surg.* 2016, 1:1.

must always carefully evaluate the general status and regional anatomy of each patient, in order to adopt and propose the most pertinent solution among multiple techniques. In this scenario, at our Institution, pedicled regional flaps still represent a valid alternative to free flaps for patients considered to be suboptimal for microvascular reconstruction [11-15].

For oral and oropharyngeal soft tissue defects that require adequate lining without the need for a bulky cover, fascio-cutaneous free flaps provide excellent results enabling optimal resurface, ensuring a good motility of the preserved structures around the resected area (preserved portions of the tongue, tongue base, floor of mouth, soft palate), giving a tight separation between oral/oropharyngeal cavity and neck contents. The microvascular workhorses for this purpose are represented by the free radial forearm flap [1] (**Figure 1**) and the by anterolateral thigh flap [2], other less popular fascio-cutaneous free flaps are the ulnar forearm [16], the lateral arm [17], the (para)scapular [16], and lateral thigh flap [18,19].

The infrahyoid myocutaneous flap [20] (**Figure 2**), the submental island flap [21] and the supraclavicular artery island flap [22] represent reliable alternative pedicled flaps in patients with poor general conditions, while the pectoralis major flap [6] and the temporal myofascial flap [10,23] can be successfully employed when the quality of recipient vessels in the neck is compromised by previous treatments.

In case of total glossectomy, musculocutaneous free flaps, such as the rectus abdominis [24-26] and the latissimus dorsi [27] or

thick fascio-cutaneous free flaps such as the anterolateral thigh flap, [26] provide enough bulk to accomplish a restoration of form, furthermore, by creating a neo-tongue/palate competence, these flaps are even able to restore some sort of initial oral propulsion of the bolus towards the pharynx. Free flaps do not suffer from pedicle-related traction and are certainly superior to pedicled flaps, however in patients with vessel depleted necks (Figure 3) or when a total glossectomy is associated with total laryngectomy (Figure 4), the reconstruction with a pectoralis major myocutaneous flap or with a latissimus dorsi myocutaneous flap (transposed as a pedicled flap) is an excellent alternative. To minimize the pedicle-related traction, it is convenient to harvest a long skin paddle which will be then tailored to the defects requirement after transposition. To increase the neo-tongue/palate competence we recommend avoiding suturing the anterior mucosa of the oral cavity with the skin paddle but instead with the underlying muscle.

For segmental mandibular resections a reconstruction with bone carrying free flaps (fibula, scapula, iliac crest, etc.) is considered nowadays the standard of care, and it is almost mandatory for anterior mandibular defects in order to avoid the so called Andy Gump deformity; for lateral segmental mandibular defects a bony free flap reconstruction is always preferable but in selected cases a soft tissue reconstruction with alternative pedicled flaps such as the pectoralis major or the latissimus dorsi can be considered as an acceptable option (Figure 5).

A recent major advance in palatomaxillary reconstruction is represented by the angular branch-based osteomuscular scapular free flap [28]. The versatility of this flap, its long pedicle with large caliber donor vessels, the morphologic similarity with maxillary bony structures and the limited donor-site morbidity compare favorably with those of other osteomuscular and osteomusculocutaneous free flaps described for such challenging reconstructive purposes.



Figure 1 Transmandibular resection with en block neck dissection for a pT3N0 squamous cell carcinoma of the lateral floor of mouth. The resection encompassed a marginal mandibulectomy, the whole lateral floor of mouth and the ventral tongue, and was extended to the lateral oropharyngeal wall. The free radial forearm flap provides excellent lining.



Figure 2 Infrahyoid myocutaneous flap reconstruction following pull through resection of an anterior floor of mouth squamous cell carcinoma, the resection encompassed a marginal mandibular resection and was carried en block with bilateral selective neck dissection.



Figure 3 Recurrent oral tongue carcinoma after previous transoral resection and neck dissection at the right hand side with adjuvant radiotherapy. Pull through resection of the oral tongue with marginal mandibular resection preserving the tongue base and left side neck dissection. The long skin paddle of the pectoralis major myocutaneous flap was tailored to the defects requirement after transposition, to increase the neo-tongue/palate competence the muscle underlying the skin paddle was sutured to the anterior mucosa of the oral cavity.



Figure 4 This patient underwent previous total laryngectomy with subtotal pharyngectomy with bilateral neck dissection and bilateral pectoralis major flap reconstruction (for pharyngeal reconstruction and for subsequent closure of salivary fistula) for a pT4aN2c piriform sinus squamous cell carcinoma, surgery was followed by adjuvant radiotherapy. Two years later he presented with a second primary requiring a transmandibular total glossectomy. The latissimus dorsi provided an excellent solution in this case.



Figure 5 This 81 year old patient underwent previous transoral resection and modified radical neck dissection for a retromolar trigone squamous cell carcinoma pT2N2b, surgery was followed by adjuvant radiotherapy. Four years thereafter he developed a second primary retromolar trigone carcinoma with mandibular invasion, salvage surgery included a segmental mandibular resection and the reconstruction was accomplished with pectoralis mayor flap.

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