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# The Use of Palatal Island Flaps as an Adjunct to Microvascular Free Tissue Transfer for Reconstruction of Complex Oromandibular Defects

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**Objective:** To determine the efficacy of using palatal island flaps in combination with free tissue transfer for reconstruction of large, complex oral cavity defects. **Study Design:** Prospective evaluation of patients with large, combined defects of the oral cavity reconstructed with palatal flaps in conjunction with microvascular free tissue transfer. **Methods:** Elevation of a palatal flap was performed after completion of tumor resection. The flap was rotated and secured into place. A free flap was then harvested and inset to reconstruct the remaining oromandibular defect. Free flaps included the rectus abdominis (6), fibula (16), and radial forearm (6). **Results:** Large complex oral cavity defects were repaired with a palatal island flap in conjunction with microvascular free tissue transfer in 28 consecutive patients. There were no complications associated with this flap. **Conclusion:** Maximal functional rehabilitation of large, complex oral defects requires independent reconstruction of the various regions of the oral cavity rather than single flap reconstruction. When used as an adjunct to free tissue transfer, the palatal island flap offers a reliable method for reconstructing large combination defects. **Key Words:** Palatal island flap, free tissue transfer, functional rehabilitation, combination defects, free flaps.

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## INTRODUCTION

Reconstruction of large, complex intraoral defects may be challenging, often requiring multiple flaps for achievement of optimal results. Restoring function has become more attainable through the use of microvascular free tissue transfer. Local flaps used in combination with free tissue transfer can often give rise to more successful outcomes than when either modality is used alone.

The palatal mucoperiosteal island flap may be used to cover defects in the soft palate, tonsillar area, and the retromolar trigone region. These flaps have found various uses, including resurfacing intraoral defects, palatal lengthening procedures, and closure of oroantral fistulas.<sup>1–4</sup>

We describe the use of palatal island flaps in combination with free tissue transfer for reconstruction of large, complex oral cavity defects.

## Technique

Tumor resection is completed and negative margins are verified by frozen-section histopathology (Fig. 1). The area to be reconstructed is evaluated and defects amenable to a palatal flap are identified. Starting anteriorly, a full-thickness mucoperiosteal flap is elevated. The ipsilateral greater palatine artery is ligated as it exits the foramen. The flap is rotated toward the defect and if further length is required, the greater palatine bundle sheath is released along its length with a scalpel while maintaining the integrity of the vessels. The flap has excellent mobility and can be rotated through 180° (Fig. 2).

An appropriate free flap is then harvested and inset to reconstruct the remaining defect (Fig. 3). The free flap is secured posteriorly to the recipient tissue bed to include the rotated palatal island flap. Patients are subsequently

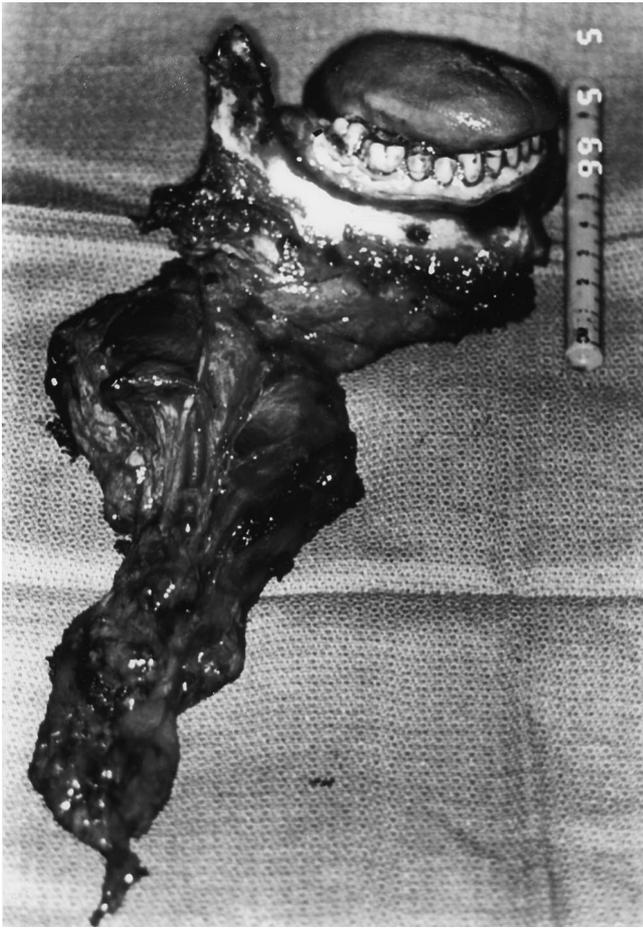


Fig. 1. En bloc resection comprising a right hemimandibulectomy, total glossectomy, right palate and retromolar trigone resection with a radical neck dissection for a T4N3 squamous cell carcinoma of the tongue.



Fig. 2. Palatal island flap based on the left greater palatine artery has been inset into the right palate and posterior portion of the retromolar portion of the defect.

followed to assess long-term healing and functional rehabilitation (Figs. 4 and 5).

## RESULTS

The palatal island flap has been used in 28 patients in conjunction with microvascular free tissue transfer for reconstruction of oral cavity defects following tumor resection. Free flaps included the rectus abdominis (6), fibula (16), and radial forearm (6). All 28 microvascular free tissue transfers in this subset of patients were successful. The use of palatal flaps in conjunction with free tissue transfer did not result in any complications, wound breakdown, fistula formation, or contracture. No partial or complete flap loss has been noted. Functionally, we have found no evidence of significant long-term velopharyngeal insufficiency (as assessed by an independent speech pathologist) in all patients who did not have more than one half of their soft palate resected in conjunction with their primary lesion. All reconstructed patients are able to use the oral route for at least some of their nutritional needs. Sixty-seven percent of the rectus abdominis group, 88% of the fibula group, and 83% of the radial forearm group were

able to maintain their nutritional state without the need for supplemental gastrostomy-tube feeds.

## DISCUSSION

Palatal island flaps have been used for some time in reconstructing various oral cavity defects.<sup>5</sup> These have included defects of the palatine arch, retromolar trigone, tonsillar fossa, and posterior floor of the mouth. There are many advantages to this flap, including its local availability, strong tensile strength with reliable blood supply, and good range of mobility. It provides adequate bulk and length, representing a single stage procedure associated with a high success rate.<sup>6-8</sup> Morbidity is low with mucosalization of the donor site complete after 4 to 6 weeks. Healing is without contraction because the secondary defect overlies bone. Mucosalization will proceed in the radiated patient at a somewhat slower pace, taking 6 to 8 weeks to complete.

The blood supply to the palatal island flap is provided by the greater palatine artery, which emerges from the greater palatine foramen and runs anteriorly to join the nasopalatine vessels emerging from the incisive foramen. The reported success rate of 97% is the result of the excellent blood supply of this flap.<sup>5</sup> Our successful trans-

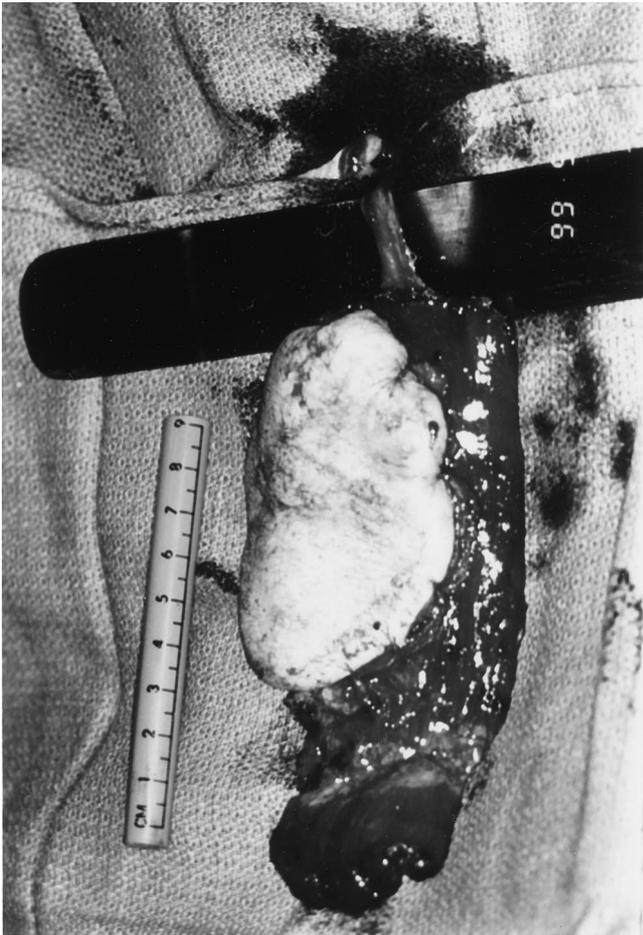


Fig. 3. Rectus abdominis free flap prior to transfer for tongue reconstruction.

fer of all 28 of our flaps compares favorably to the reported literature. Complications are rare and include hemorrhage and partial palatal flap necrosis.<sup>9,10</sup> In our series of patients, there was no partial or complete flap loss. In addition, this flap's excellent vascularity resulted in lack of any wound breakdown, even in the subset of patients that had received preoperative radiation therapy (n = 8).

Up to 75% of the soft tissue overlying the hard palate may be mobilized, providing 8 to 10 cm of tissue coverage. If greater length is required, the neurovascular bundle can be released by widening the greater palatine foramen, giving approximately an extra 1 cm of length.<sup>6</sup> When used for soft palate reconstruction, one should strive to "push back" the palatal flap, so that it lies more posterior than the native palatal position. We feel that such flap lengthening on the reconstructed side will compensate for the loss of muscular action, thereby minimizing velopharyngeal insufficiency.

Palatal island flaps used in combination with free flaps provide a reliable method for reconstruction of large, complex oral defects. They appear best suited to complement the soft tissue coverage provided by the cutaneous paddle of the free tissue transfer when used for large retromolar trigone resections. We feel that single flap reconstruction of palate, tongue, and floor of mouth com-



Fig. 4. Postoperative result at 19 days demonstrating early mucosalization of the hard palate defect.

bination defects is not the ideal method of reconstruction. To maximize functional rehabilitation, independent reconstruction of each of these areas is ideal, allowing for an increase in oral mastication and deglutition abilities as well as a decrease in the incidence of velopharyngeal insufficiency.<sup>11-17</sup> In addition, the adjunctive use of this simple and reliable local flap decreases the complexity and bulk of tissue that needs to be incorporated in the free tissue transfer. Generally, the palatal island flap is used for reconstruction of the soft palate and medial retromolar



Fig. 5. Postoperative result at 3 months. Patient is tolerating a full soft diet by mouth and remains tracheotomy-free. Note the lack of retraction of the right hemipalate and the stability of the reconstructive effort. Superficial erosion in the midline of the neo-tongue is secondary to a cigarette burn (patient still smoking).

trigone. The cutaneous paddle of the microvascular free tissue transfer is used for the floor of mouth, neo-tongue, and lateral aspect of the retromolar trigone. In this way, the relatively thin tissue of the medial retromolar trigone and soft palate is reconstructed independently with similar thickness tissue as opposed to the relatively bulky cutaneous paddles of the free flaps. We feel that this will serve to maximize the normalization of the oral cavity structure, improving the ability of the patient to functionally adapt to the post-surgical changes.

## CONCLUSION

Optimal functional rehabilitation of large, complex oral defects may be challenging and require independent reconstruction of the various regions rather than single flap reconstruction. When used as an adjunct to free tissue transfer, the palatal island flap offers a reliable method for reconstructing large combination defects. To our knowledge, this is the first report of the use of this flap in conjunction with microvascular free tissue transfer in a large series of patients. We have found this method simple to teach, reliable, and easy to apply.

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