Hard Palate Reconstruction With a Pedicled Osteomyocutaneous Mandible Flap: Case Report

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Oncologic resection of palatal neoplasms will predictably lead to significant oral dysfunction, affecting both speech intelligibility and deglutition. The resulting velopharyngeal insufficiency may be corrected with the fabrication of an obturator or by flap reconstruction. The use of obturators is associated with a decrease in operating time and elimination of flap donor site morbidity, whether regional or distant. Disadvantages associated with a prosthesis include a prolonged fabrication process of up to 1 year and the high cost, as well as the need for regular removal and cleaning by the patient. Alternatively, flap reconstruction provides for immediate and permanent correction of the oronasal communication, but increases operating room time and is associated with the possibility of donor morbidity at the flap harvest site.

The pedicled osteomyocutaneous mandible flap has shown utility in the reconstruction of composite mandibular defects.[1] Its use as a method of reconstructing the hard palate represents a novel application of this flap, which is described herein using an illustrative case example.

Report of Case

A 74-year-old white male smoker presented for evaluation and treatment of a neglected nasal vestibule lesion that had been progressively enlarging for 8 months before presentation (Fig 1). Biopsy and radiographic examination confirmed the presence of a moderately well-differentiated squamous cell carcinoma that appeared to be originating from the nasal vestibule, with local extension into the entire lower one half of the nose, as well as overt destruction of the hard palate (Fig 2). No regional cervical lymph node enlargement or distant metastases were noted on clinical and radiographic examination.

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The patient underwent primary surgical removal of the lesion en bloc to include the lower one half of the nose, central two thirds of the upper lip, entire hard palate and anterior one half of the soft palate (Fig 3). Clear surgical margins were achieved. The patient was left with a complex midfacial defect (Fig 4).

The patient did not desire prosthetic rehabilitation. Therefore, surgical restoration of the hard palate was essential to allow for separation of the oral and nasal cavities and provide for optimal speech and swallowing function, as well as to serve as the foundation on which to commence nasal and lip reconstruction. A forehead flap with calvarial and auricular cartilage grafts was used for nasal reconstruction and rotation flaps for lip reconstruction. The hard palate was reconstructed with a pedicled osteomyocutaneous mandible flap. This flap was based on the submental branch of the facial artery. An inframandibular skin paddle approximating the mucosal portion of the palatal defect (both hard and soft palate) was incised circumferentially down through the platysma. Subplatysmal flaps were developed over the inferior aspect of the mandible to the egress of the mental nerve, posteriorly to the level of the facial artery, and inferiorly to the hyoid bone. The marginal branch of the seventh nerve was identified and preserved. The submental artery and vein are identified as consistent branches of the facial artery and vein at the superior border of the submandibular gland. The pedicles are then followed to the lateral aspect of the skin paddle. Next, an oscillating saw is used to fashion a horizontal mandibular osteotomy passing just inferior to the mental foramina. The periosteum should be left on the flap to maintain the integrity of the
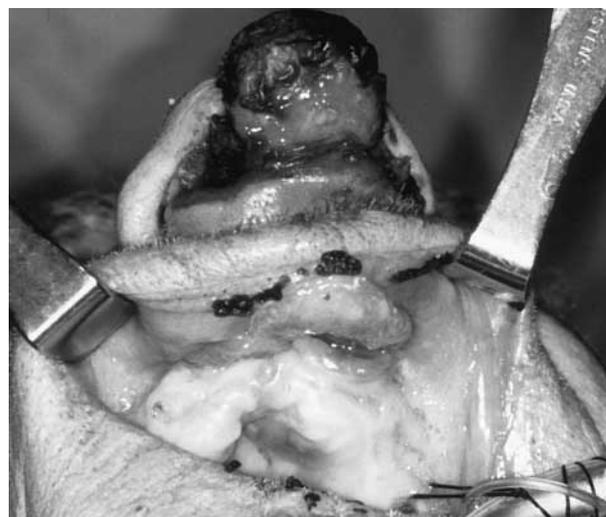

FIGURE 1. Patient with squamous cell carcinoma of the nasal vestibule involving the upper lip and anterior palate.

FIGURE 2. Axial computed tomography scan showing osseous destruction of the hard palate in the midline by the vestibular carcinoma.

periosteal branches of the submental artery. The muscular portion of the flap was now delineated by inclusion of the anterior bellies of the digastric muscle and by maintaining a plane of dissection immediately superficial to the mylohyoid muscle. The facial artery was next ligated above the takeoff of the submental branch in order to increase flap pedicle length (Fig 5). A subcutaneous tunnel was then fashioned through the right cheek, and the flap was rotated into position in a tension-free manner (Fig 6). Wide undermining of the neck skin allowed for primary closure of the donor site. The harvested mandible corresponded both in shape and length to the osseous hard palate defect into which it is rigidly fixated with miniplates (1.7 mm, Leibin-

FIGURE 4. View of complex midfacial defect involving the nose, upper lip, and hard palate. A cutaneous paddle measuring 5 x 6 cm based on the submental branch of the facial artery is outlined in the upper neck.

FIGURE 3. Resected specimen includes the lower two thirds of the nose, central two thirds of the upper lip, and hard palate.

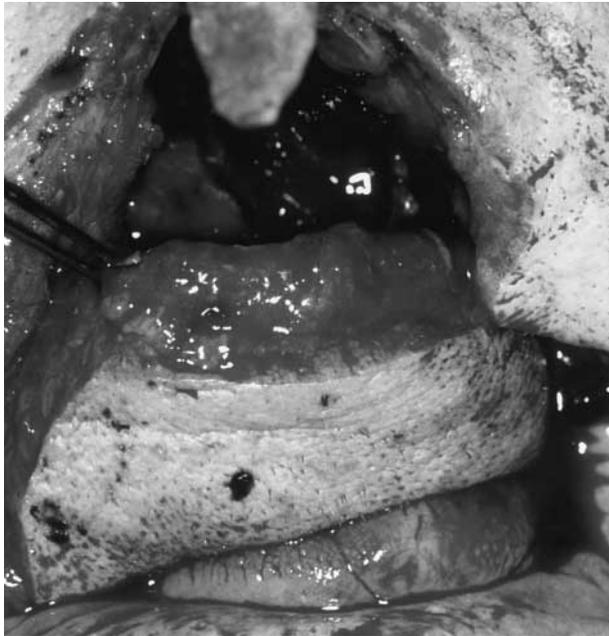**FIGURE 5.** The flap has been harvested and is pedicled on the right submental artery and vein.

FIGURE 6. The flap has been rotated into position into the midfacial defect through a subcutaneous right cheek tunnel.
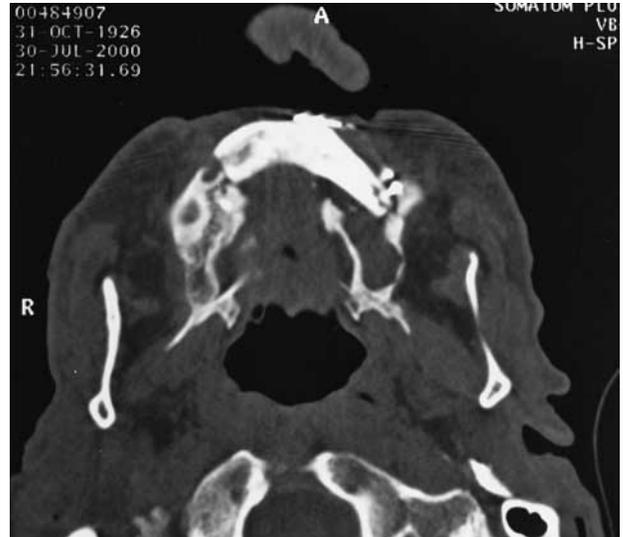

FIGURE 8. Axial computed tomography scan showing flap reconstruction of the anterior palatal defect. Note the curvature of the mandibular flap simulating the natural contour of the anterior palate and premaxilla without the need for osteotomies.

ger, Kalamazoo, MI). The skin paddle was sutured to the soft palate remnant posteriorly and the upper lip reconstruction anteriorly.

The patient's postoperative course was uneventful. He was able to tolerate a soft diet by mouth, and speech intelligibility was excellent. There was no evidence of either velopharyngeal insufficiency or oronasal fistula (Figs 7 through 9).

Discussion

Separation of the oral and nasal cavities after palatectomy poses a significant challenge to the reconstructive surgeon. Restoring lost tissue from the soft palate may be variably accomplished with a variety of local and distant cutaneous or fasciocutaneous flaps.[2-4] However, despite filling the soft tissue void, the loss of dynamic mobility during swallowing can still lead to some degree of velopharyngeal incompe-

FIGURE 7. Plain anteroposterior radiograph showing rigid fixation of the osseous portion of the flap.

FIGURE 9. Postoperative appearance showing adequate support for upper lip and nasal reconstruction.

FIGURE 10. Intraoral view showing rehabilitation of the hard palate defect with good soft tissue support.

tence. The adjunctive use of pharyngeal flaps in such a circumstance may be valuable.

Reconstruction of the hard palate after its complete resection poses a more difficult problem. To fully restore the premorbid form, one must replace not only the soft tissue deficit, but also provide for an osseous foundation. Free bone grafts and pedicled calvarial grafts, as well as a variety of distant microvascular free tissue transfers have been used for this purpose, with variable success.[5-7] The pedicled osteomyocutaneous mandible flap, based on the submental branch of the facial artery, may represent an alternative, not only in mandibular reconstruction, but also in palatal restoration. A bony flap centered over the symphysis menti should be used for midline palatal and premaxillary defects; an ipsilateral mandibular body harvest site is more appropriate for unilateral defects. Such a configuration will precisely replicate the 3-dimensional curvature of the lost hard palate tissue without the need for osteotomies that could potentially affect flap vascularity. The osseous portion of the flap should be rigidly fixed at the recipient site to decrease the possibility of flap mobility or graft resorption.

The extent of the soft palate defect will determine the size and shape of the cutaneous paddle. The skin paddle harvest site should be oriented vertically and horizontally to mirror the soft palate defect. The donor site morbidity is minimal. If a centrally located flap is harvested, then no significant aesthetic or func-

tional consequences are noted. In laterally located harvest sites, the application of a reconstruction bar across the inferior aspect of the defect will provide for excellent camouflage, as we have noted in cases of flap harvest for mandibular reconstruction. A minimum of 22 mm of mandibular height is required at the donor site to provide for adequate flap vascularity and to ensure donor site stability.[1] Intraoral hair growth, as noted in other flaps, significantly decreases with the use of the postoperative radiation therapy that many of these patients will require. Laser hair removal is also a viable alternative.

We have found our initial experience with the use of the pedicled osteomyocutaneous mandibular flap for palatal reconstruction to be quite favorable. The flap is simple and quick to harvest, and the ability of the pedicled tissue to mirror the palatal defect provides a significant potential benefit of this reconstructive modality as compared with other available techniques. Its local availability without the need for osteotomies or distant site morbidity, as well as the significant operative timesaving, pose an advantage over free tissue transfer. The availability of a large amount of bone stock better reflects the amount noted in the native hard palate and premaxilla than pedicled calvarial bone flaps which, in addition, are difficult to contour into the required shape and provide for inadequate nasal support in the case of an adjunctive rhinectomy. The pedicled osteomyocutaneous mandible flap may represent an alternative in palatal reconstruction.

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