The Journal of Laryngology and Otology
June 1994, Vol. **108**, pp. 486–489

Advancement cheiloplasty for reconstruction of floor of mouth defects

JOHN S. RUBIN, M.D., F.A.C.S.

Abstract

In many cases of carcinoma of the floor of mouth, oncologic resection includes marginal mandibulectomy. Reconstruction poses a significant challenge. Requirements include coverage with thin but supple tissue to allow for dental implant or denture, and recreation of a mobile tongue and sensate floor of mouth gutter. Reconstructive efforts have ranged from skin grafts to free flaps, with variable success in fulfilling the above-mentioned requirements.

This paper describes the preferred technique of the author, in which external mandibular periosteum is saved and elevated with a submucosal flap of lower lip, raised to the level of the vermilion border. This flap is then advanced to ventral tongue. In this manner the entire anterior floor of mouth can be reconstructed.

Cases are presented demonstrating different aspects to the technique.

Key words: Mouth neoplasms; Mouth floor, surgery, Lip

Introduction

A wide variety of procedures have been utilized for reconstruction of the floor of mouth post-resection for malignancy. These have ranged from healing by secondary intention and primary closure or skin grafts to tongue flaps, local/regional cutaneous flaps, myocutaneous flaps and free flaps (Gluckman and Savoury, 1991). A brief review of recent literature demonstrates utilization of the following flaps in this setting: nasolabial flaps and forehead flaps (McGregor, 1992), infrahyoid flap (Rojananin and Suphaphongs, 1991), sternomastoid flap (Tiwari, 1990), pectoralis major flap (Schusterman *et al.*, 1991; Kasler *et al.*, 1992), trapezius flap (Netterville *et al.*, 1987; Aviv *et al.*, 1992) and latissimus dorsi flap (Haughey and Frederickson, 1991). Free flaps in the recent literature include peritoneum (Mixter *et al.*, 1991) iliac crest, skin and/or internal oblique (Urken *et al.*, 1991), latissimus dorsi (Urken *et al.*,1991) and radial forearm (Davidson *et al.*, 1991; Schusterman *et al.*, 1991).

The object of this paper is to resubmit the use of a local advancement flap of external mandibular periosteum and local lip mucosa, a flap which the author calls the advancement cheiloplasty. Under appropriate circumstances, this advancement flap can be used to reconstruct the entire anterior floor of mouth as well as a portion of the ventral tongue.

Technique

The procedure of advancement cheiloplasty is best performed on an edentulous lower jaw. It should only be utilized following resections performed through the open mouth and in which the lower lip has not been split. It is only necessary to use this flap in cases in which marginal mandibulectomy has been performed as part of the resection. In this procedure, the external periosteum is carefully freed from the lower alveolus, mobilized inferiorly to the labio-alveolar sulcus, and left attached to lower lip gingiva. This is performed prior to the marginal mandibulectomy. Figures 1 and 2 present line drawings of a patient with verrucous cell carcinoma of the floor of mouth, before and after local resection. Figure 2 shows external periosteum freed from the lower alveolus and mobilized to the level of the gingival mucosa. After the ablative procedure is completed, dissection is then continued into the lower lip gingiva, a labial flap being elevated superficial to the muscular layer. It is dissected to the level of the vemilion border. In this fashion, a broad-based flap consisting of composite mucosa and periosteum is obtained. Figure 3 is a cross-section showing an artist's representation of this flap elevated. The flap is then mobilized in a posterior fashion and laid over the raw surface of inner cortex or the lower jaw and the raw tissues left behind post-resection. Periosteum is sutured to the remaining ventral surface of the tongue (Figure 4). This is a sturdy layer and allows for a secure closure. No packing or bolster dressing is required. The patient can usually begin oral alimentation at six to seven days post-operatively. The resultant degree of mobility allows the tongue to be extended outside the mouth, moved to left and right and up inside the mouth to touch the roof of mouth, thus maximizing quality of deglutition for the patient post-operatively, and usually allows the use of a denture (Figures 5 and 6).

Case reports

Case 1

An 81-year-old edentulous male presented with exten-

From the Montefiore Medical Centre, Bronx, N.Y., USA.
Accepted for publication: 20 November 1993.

https://doi.org/10.1017/S0022215100127173 Published online by Cambridge University Press

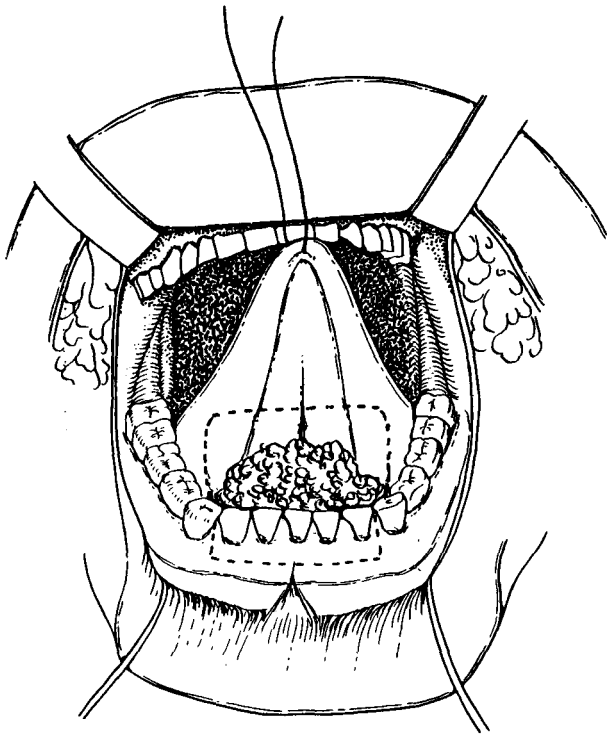

FIG. 1

Line drawing showing verrucous carcinoma of the floor of mouth. Dotted lines are artist's representation of margins of resection.

sive verrucous cell carcinoma involving the anterior floor of mouth bilaterally and extending on the lateral floor of mouth on the right. Due to the proximity to the mandible, a marginal mandibulectomy was performed at surgery together with wide excision of the primary tumour. In this

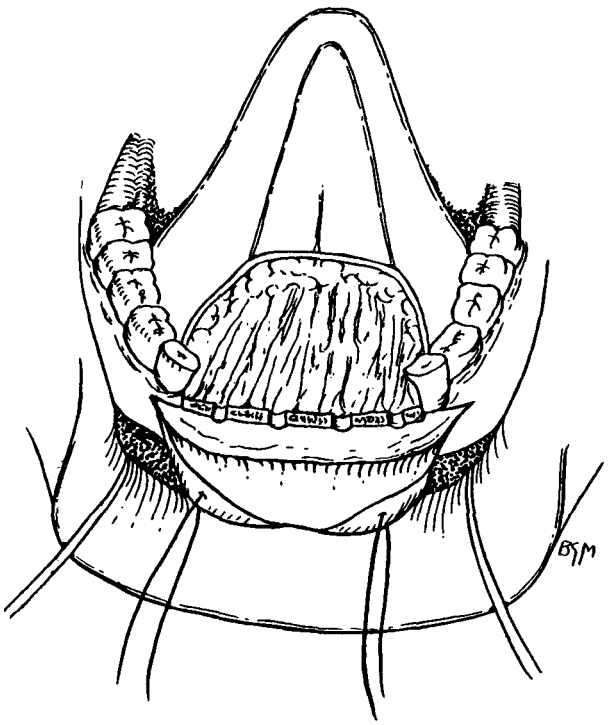

FIG. 2

Line drawing demonstrating the operative field post-resection with the external periosteum freed from the lower alveolus and mobilized to the level of the gingival mucosa of the lower lip.

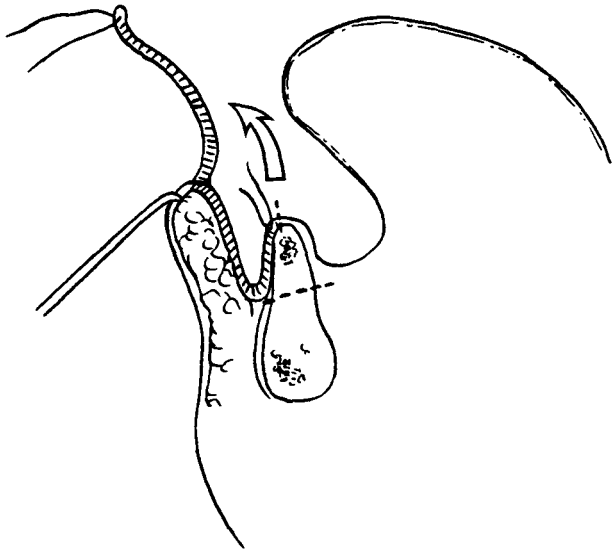

FIG. 3

Line drawing demonstrating artist's cross-sectional representation of elevated flap, consisting of external periosteum and gingival mucosa of lower lip.

fashion, the entire anterior floor of mouth was resected to the level of the ventral tongue, which was left intact. Reconstruction was performed with advancement cheiloplasty. The patient healed uneventfully and has wide mobility of the tongue as demonstrated in Figures 3 and 4.

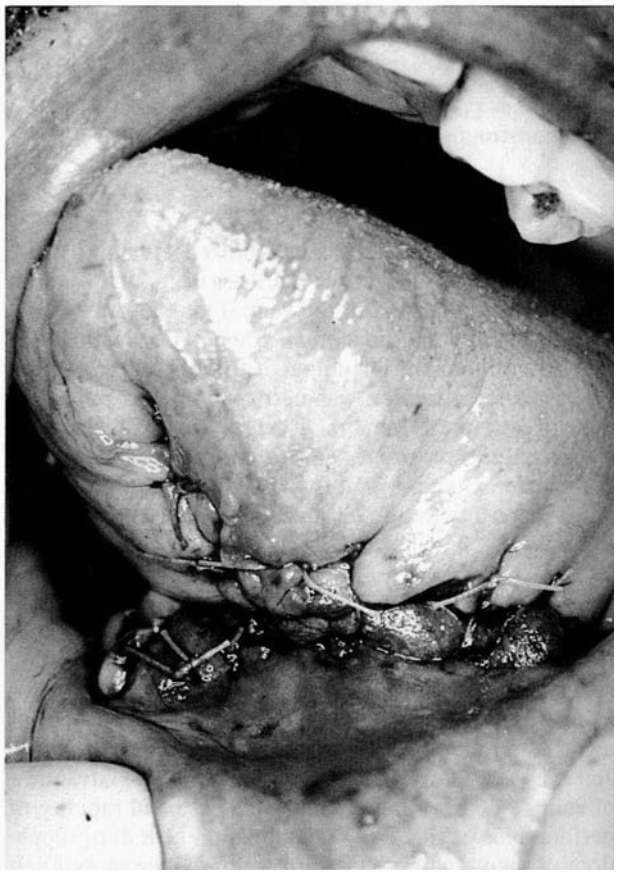

FIG. 4

Reconstruction of floor of mouth and ventral tongue with advancement cheiloplasty technique.

https://doi.org/10.1017/S0022215100127173 Published online by Cambridge University Press

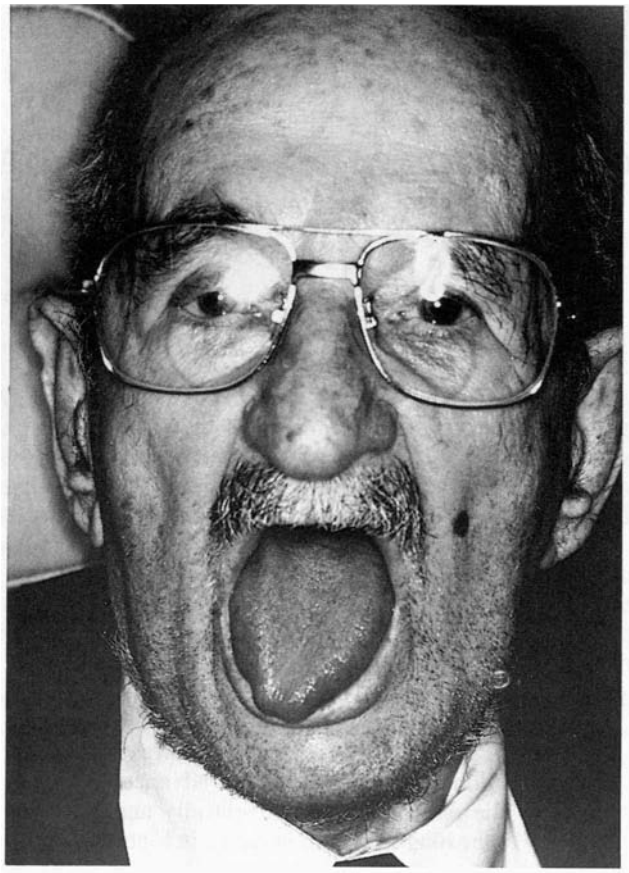

FIG. 5
Post-operative view demonstrating range of motion of the tongue outside the mouth.

This case is presented as a fairly standard application of the reconstruction.

Case 2

A 41-year-old male presented with a deeply infiltrating squamous cell carcinoma of the floor of mouth, 3 cm in diameter with invasion of the ventral tongue. At surgery, he underwent marginal mandibulectomy with wide excision of tumour including a portion of the ventral tongue. Reconstruction was performed by advancement cheiloplasty to the remaining ventral tongue. This case, including an early post-operative line drawing (Figure 2) of the reconstruction, is presented to demonstrate the use of the reconstruction in instances in which ventral tongue is involved.

Discussion

Advancement of buccal mucosa to close a small defect in the floor of mouth is not a new technique (Silver and Missiorek, 1986; Sessions *et al.*, 1992). The concept of using it to reconstruct the entire anterior floor of mouth and even ventral tongue is discussed here. The advantage of using this local tissue, other than ease and rapidity of performance of the flap, is the creation of a thin, supple floor of mouth without impairment of tongue mobility. It is intrinsically superior to tongue flaps, which are likely to bind down the tongue, or to most myocutaneous flaps which are much more bulky. It is probably no better than

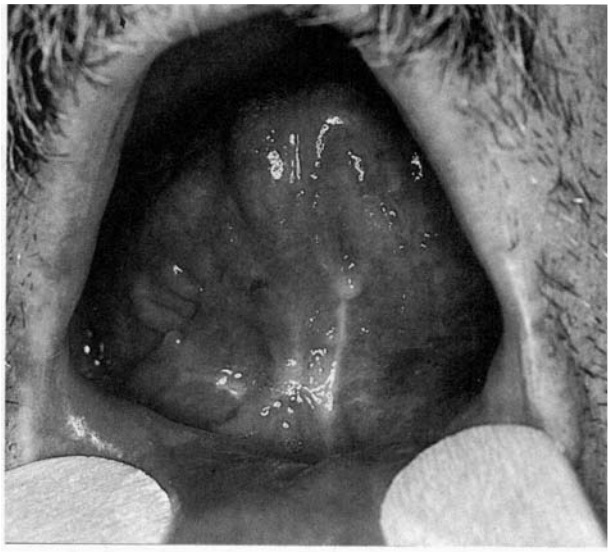

FIG. 6
Close-up view demonstrating range of motion of the tongue inside the mouth post-surgery.

the radial forearm flap, but is a much less morbid procedure, and has the advantage of being sensate.

The advancement cheiloplasty has certain limitations. It is much less useful in the presence of a full set of lower teeth in that the flap is more difficult to inset and loses a good deal of viability. The procedure should also not be performed if the lower lip needs to be split in order to access the tumour; nor should it be used if a marginal mandibulectomy is not part of the treatment plan as the inclusion of the first and exclusion of the second procedures cause, respectively, decreased viability and reach of the flap. Nonetheless it is a simple procedure, with minimal morbidity and, when used in the appropriate circumstances, allows for safe reconstruction of the entire anterior floor of mouth without encroaching upon tongue mobility.

References

Aviv, J. E., Urken, M. L., Lawson, W., Biller, H. F. (1992) The superior trapezius myocutaneous flap in head and neck reconstruction. *Archives of Otolaryngology, Head and Neck Surgery* **118:** 702–706.

Davidson, J., Boyd, B., Gullane, P., Rotstein, L., Freeman, L., Manktelow, R., Rosen, I. (1991) A comparison of the results following oromandibular reconstruction using a radial forearm flap with either radial bone or a reconstruction plate. *Plastic and Reconstructive Surgery* **88:** 201–208.

Gluckman, J. L., Savoury, L. W. (1991). *Otolaryngology*. 3rd Edition. (Paparella, M. M., Shumrick, D. K., Gluckman, J. L., Myerhoff, A. E., eds.), W. B. Saunders Co., Philadelphia, pp 2041–2067.

Haughey, B. H., Frederickson, J. M. (1991) The latissimus dorsi donor site. *Archives of Otolaryngology, Head and Neck Surgery* **117:** 1129–1134.

Kasler, M., Banhidy, F. G., Trizna, Z. (1992) Experience with the modified pectoralis major myocutaneous flap. *Archives of Otolaryngology, Head and Neck Surgery* **118:** 931–932.

McGregor, I. A. (1992). *Rob and Smith's Operative Surgery – Head and Neck*, Part I, (McGregor, I. A., Howard, D. J., eds.), Butterworth-Heinemann Ltd, Oxford, pp 254–269.

Mixter, R. C., Mayfield, K., Dibbell, D. G., Rao, V. K. (1991) Intraoral reconstruction with a microvascular peritoneal flap. *Plastic and Reconstructive Surgery* **88:** 452–457.

Netterville, J. L., Panje, W. R., Maves, M. D. (1987) The trapezius myocutaneous flap. Dependability and limitations. *Archives of Otolaryngology, Head and Neck Surgery* **113:** 271–281.

https://doi.org/10.1017/S0022215100127173 Published online by Cambridge University Press

Rojananin, S., Suphaphongs, N. (1991) The infrahyoid musculocutaneous flap in head and neck reconstruction. *American Journal of Surgery* **162:** 400–403.

Schusterman, M. A., Kroll, S. S., Weber, R. S., Byers, R. M., Guillamondegui, O., Goepfert, H. (1991) Intraoral soft tissue reconstruction after cancer ablation: a comparison of the pectoralis major flap and the free radial forearm flap. *American Journal of Surgery* **162:** 397–399.

Sessions, D. G., Cummings, C. W., Weymuller, E. A., Makielski, K. A., Wood, P. (1992). *Atlas of Access and Reconstruction in Head and Neck Surgery*, Mosby Year Book, St Louis, pp 41–42.

Silver, C. E., Missiorek, D. J. (1986). *Atlas of Head and Neck Surgery*, (Silver, C. E., ed.), Churchill-Livingstone, New York, pp 75–112.

Tiwari, R. (1990) Experiences with the sternocleidomastoid muscle and myocutaneous flaps. *Journal of Laryngology and Otology* **104:** 315–321.

Urken, M. L., Weinberg, H., Vickery, C., Buchbinder, D., Lawson, W., Biller, H. F. (1991) Oromandibular reconstruction using microvascular composite free flaps. *Archives of Otolaryngology, Head and Neck Surgery* **117:** 733–744.

Address for correspondence:
Dr John S. Rubin, M.D., F.A.C.S.,
48 Sagamore Road,
Bronxville,
N.Y. 10708,
USA.

https://doi.org/10.1017/S0022215100127173 Published online by Cambridge University Press