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Reconstruction for Total and Near-Total Glossectomy Defects

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- 10 years of experience with total or near-total tongue reconstruction at The University of Texas M.D. Anderson Cancer Center
- Sensory reinnervation
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Although functional outcomes after reconstruction for partial glossectomy defects are generally good, speech and swallowing functions after reconstruction for total and near-total glossectomy defects remain disappointing. The extent of surgical resection may be the most important factor affecting function. Better function results when more tongue musculature is left intact. Small defects, such as of one quarter of the tongue or less, may be closed primarily with maximum preservation of tongue mobility and function. Larger defects, such as a hemiglossectomy defect, are best reconstructed with a thin fasciocutaneous flap [1,2], such as a radial forearm or thin anterolateral thigh flap. Even a thin flap will provide adequate bulk for these defects, but more important, a thin flap with proper insetting preserves the mobility of the remaining tongue without tethering [**Fig. 1**].

Defects larger than a hemiglossectomy will require more tissue bulk, and less muscle is left to move the reconstructed tongue. Tissue bulk is important for large defects for two reasons. First, it is needed to help the tongue touch the palate to produce better speech and push food toward the hypopharynx. Second, the tissue bulk diverts saliva and food to the lateral gutters during swallowing to minimize aspiration [3]. To achieve adequate tissue bulk, large defects are typically reconstructed with a myocutaneous flap, such as a rectus abdominis myocutaneous flap [4]. Although these flaps provide good coverage and bulk initially, the bulk usually diminishes with time because of muscle atrophy, particularly after radiotherapy. In obese patients, the flaps are too bulky to be placed intraorally. Some surgeons use the muscle only with skin grafting in these situations. These muscle flaps with skin grafts are, however, more prone to atrophy. In addition to providing coverage and bulk, various flaps have been used in attempts to provide sensory and motor reinnervation. In this article, we review our clinical experience with total and near-total tongue reconstruction at The University of

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Fig. 1. Result of a reconstruction of a hemiglossectomy defect with a radial forearm free flap at 6 months. With proper flap insetting to recreate the sublingual sulcus and the lateral gutter, the mobility of the remaining tongue is preserved with minimal tethering. This patient had full range of motion of the reconstructed tongue, tolerated a regular diet, and had 99% speech intelligibility according to an evaluation by our experienced speech pathologists.

Texas M.D. Anderson Cancer Center and review techniques of sensory and motor reinnervation.

10 years of experience with total or near-total tongue reconstruction at The University of Texas M.D. Anderson Cancer Center

From January 1994 to April 2004, 245 patients with tongue cancer underwent flap reconstruction after glossectomy at The University of Texas M.D. Anderson Cancer Center. There were 151 partial, 70 total, and 24 near-total glossectomies performed. Near-total glossectomy was defined as resection of the entire mobile tongue and more than 50% of the tongue base. Of the 94 patients who underwent total and near-total glossectomy, 59 were men and 35 were women. The mean age (±SD) was 56 ± 13 years (range: 31 to 83 years). The number of cases per year varied from five to 16 but appeared to have increased in recent years [Fig. 2]. Half the patients (47) had recurrent cancers [see Fig. 2]. Forty-five patients (48%) had undergone prior radiotherapy, and 38 patients (40%) had undergone preoperative chemotherapy. Postoperative radiotherapy was administered in 44 patients (47%), and postoperative chemotherapy was given to 35 patients (37%). The percentage of patients who underwent chemotherapy increased over time [Fig. 3]. Sixteen (17%) of the 94 patients also required segmental mandibulectomy.

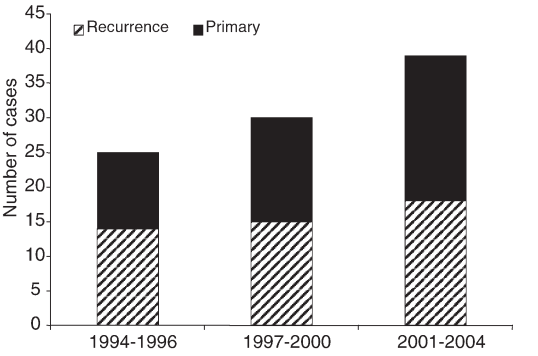

Fig. 2. Number of cases in the arbitrarily divided three time periods.

Four patients underwent reconstruction with a pedicled pectoralis major flap, and the other 90 patients underwent free flap reconstruction [Table 1]. Overall, the most frequently used free flap was the rectus abdominis myocutaneous flap. However, the flap of choice changed over time. The anterolateral thigh flap became the most commonly used flap after its introduction by the first author in 2001. Sensory and motor reinnervation and double free flaps for concomitant segmental mandibulectomy were also performed in recent years.

Recipient arteries included the external carotid artery (45 patients), the lingual artery (24 patients), the facial artery (eight patients), the superior thyroid artery (eight patients), the ascending pharyngeal artery (three patients), the common carotid artery (one patient), and the transverse cervical artery (one patient). There was a steady decrease in the use of the external carotid artery and a steady increase in the use of its branches over time [Fig. 4]. Recipient veins included the internal jugular vein (66 patients), the facial vein (20 patients), the ex-

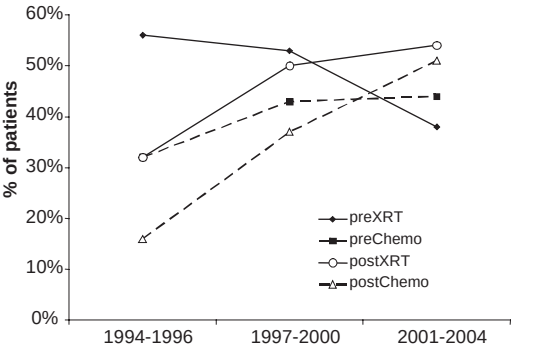

Fig. 3. The percentage of patients who underwent radiotherapy before reconstruction (preXRT), preoperative chemotherapy (preChemo), postoperative radiotherapy (postXRT), and postoperative chemotherapy (postChemo) in the three time periods.