

Tongue Reconstruction After Hemiglossectomy Due to Cancer by Submental Flap: A Case Series

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Abstract: We report three clinical cases using a submental flap to reconstruct the half-tongue defects after tongue cancer surgery at Hue Central Hospital (Hue city, Vietnam). The size of the flap ranged 30–60mm. The time to take flap ranged 50–60 minutes. All three patients did not have liquid accumulation, wound infection and bleeding after surgery; the flap survived well. All patients were taken the nasogastric tube out after ten days and discharged after two weeks. Postoperative functional (speech, swallowing) and tongue aesthetic assessments (symmetry) were good. These cases highlight that the submental flap is a choice for patients with flaws in the tongue. It ensures both functional and aesthetic for the regenerative tongue and donor site.

Keywords: tongue reconstruction, hemiglossectomy, submental flap

Background

Tongue cancer is the most common cancer of the oral cavity, while tongue is the first part of the digestive tract.¹ The disease progresses locally in the region, rarely for distant metastases.² Surgery and radiotherapy remain the mainstays of treatment for primary tumors and regional lymph nodes.³ The overall survival rate after 5 years for stages I, II is 70.9%, for stages III, IV is only 28.8%.⁴ The combination of surgery and radiation therapy for advanced disease is the standard treatment. In clinical practice, surgery is the method of choice more often.

In most cases, extensive resection of the primary tumor is hemiglossectomy.⁵ Therefore, the defect is quite large, greatly affecting patients' speech function and swallowing after treatment. After tumor removal surgery, the restoration of oral defects should ensure both morphology and function. The submental flap was first described in 1993 by Martin and is increasingly widely used with many advantages: morphology, color and organization, which are in harmony with the cut tissue, long flap (up to 8cm long), good vitality pedicle, scars at the flap site are covered by the lower margin of the chin.⁶ In addition, many studies have shown that the submental flap is safe and effective when performing plastic surgery for a group of patients with oral cavity cancer.^{7–12}

Many previous studies showed that pectoralis major flap reconstruction was a safe treatment in terms of cancer. However, the disadvantage of this flap was the cumbersome pedicle of the flap.^{13–15} We found that the submandibular flap has many advantages and can overcome this disadvantage, so we used this flap to reconstruct the tongue defect of 3 patients after tongue cancer surgery at Hue Central Hospital.

Case Series

Three patients with tongue cancer at stage T2, whose pathological resulted in squamous cell carcinoma, underwent the operation of extensive surgical removal of tumor tissue, neck lymph node dissection and submental flap reconstruction at Odonto-Stomatology Center, Hue Central Hospital from July 2021 to October 2021 (Figure 1). The characteristics of the cases and the early outcomes are shown in Table 1.

According to Sittitrai and Paydarfar, the early outcomes were evaluated based on these criteria:^{16,17}

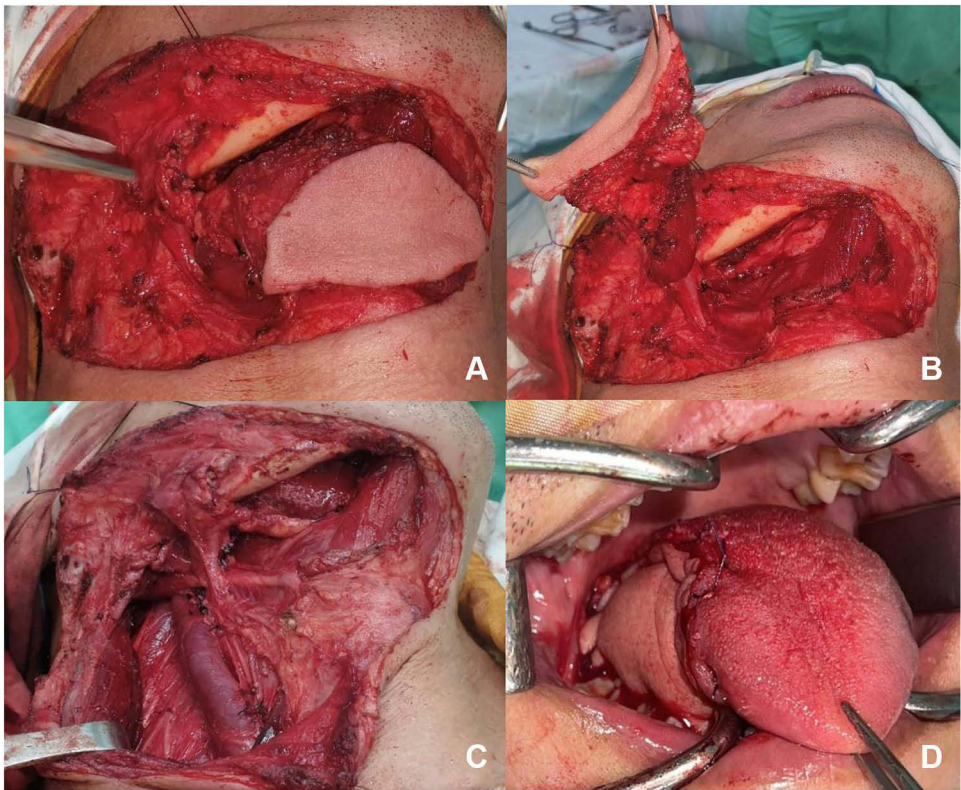


Figure 1 These pictures illustrated the steps in the operation process: **(A)** Harvesting submental flap, **(B)** Exposure of the pedicle, **(C)** Putting the flap into the defect, **(D)** Suturing of the half-right of the tongue.

- The degree of blood circulation of the flap: Good: Bright pink flap; blood-receiving capillaries rapidly return immediately after decompression; The flap bloated because it receives adequate blood and a good pinprick test (bleeding, bright red blood). Average: The flap is pale, turning purple; slow return of blood-receiving capillaries (2 minutes); The flap was less edematous and the pinprick test showed little bleeding. Poor: The flap is purple; no blood receiving is observed; The flap was flaccid and non-edematous and there is no blood during the pinprick test.

Table 1 Characteristics of the Cases and the Early Outcomes

	Patient 1	Patient 2	Patient 3
Gender	Male	Male	Female
Location of tongue defects	Lateral border of the tongue	Lateral border of the tongue	Ventral surface
Stage	T2	T2	T2
Pathological features	Squamous Carcinoma	Squamous Carcinoma	Squamous Carcinoma
Flap size (mm)	27–55	30–60	35–68
Time to take flap (mean, minutes)	54	55	60
Hospitalization duration (mean, days)	10	11	12
Time to remove nasogastric tubes (mean, days)	6	7	8
Early outcome	Good	Good	Good

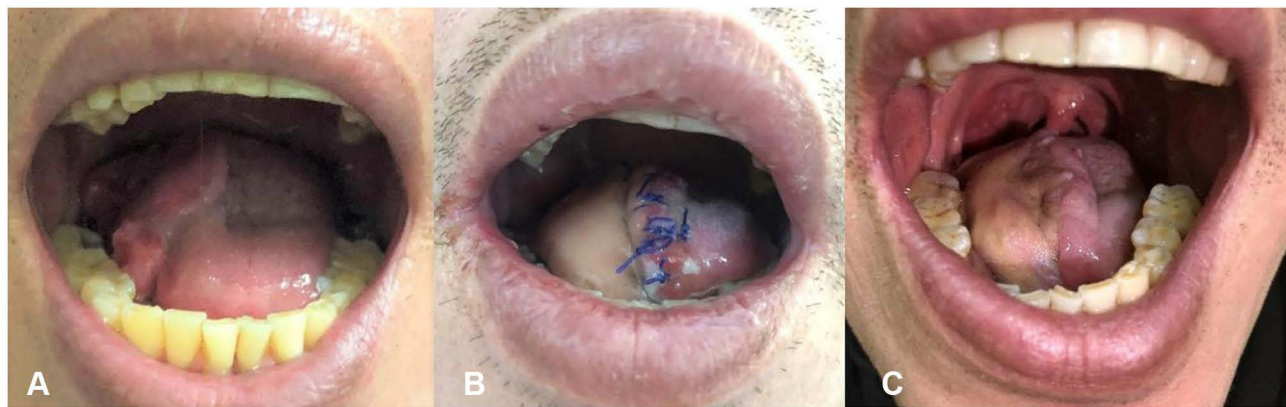


Figure 2 Submental flap tongue reconstruction: (A) Initial, (B) One week postoperatively, (C) One month postoperatively.

- State of flap: Good: No necrosis; no ulcers; The oral cavity has no odor. Average: The flap is partially necrotic (1/10 at the end of the flap); ulcers in 2–3 locations on the flap; The oral cavity does not have a rotten smell. Poor: Necrosis of the entire flap; ulcer - bacterial infection; The oral cavity has a rotten smell of necrotic tissue.

- Surgical evaluation: Good: No further intervention. Average: Need to repair part of the flap. Poor: Have to make another flap.

Postoperatively, no patient had partial necrosis of the flap or developed complications (infection, bleeding). The neck drainage was withdrawn after 24 hours and the time for nasogastric tube removal was 7 days (Figure 2). All patients spoke normally and could swallow. The submental flap gave good cosmetic results. There were no patients with drooping mouth after surgery. All three patients were discharged 10–12 days after surgery (Table 1).

Discussion

For cancer cases, the recommended cut margin is 2cm. However, with this width, function will be significantly affected even if the tumor is only small in size. Currently, cutting edge of 1cm three-dimensionally is accepted for oral cavity cancer in general and tongue cancer in particular. With this cut margin, the positive cross-sectional rate is 10%.¹⁸ Feng et al performed a wide resection of the lesion with a cut margin of 1.5 cm. Still, this study did not find a significant difference when comparing with a margin of 1 cm.¹⁹ Therefore, in this patient, we performed a wide resection of the tongue lesion with a cut area of at least 1cm from the tumor in three-dimensional. The results of the biopsies of the cutting margin did not detect any malignant cells.

The submental flap was first described in 1993 by Martin. It became popular in plastic surgery for small and medium-sized defects in the oral cavity with many advantages such as fast flap taking time while ensuring both safety and aesthetics.⁶ The flap has a pedicle from the submental artery, a large lateral branch of the facial artery which dissociates before the artery crosses the lower surface of the mandible, with a flap defect that coincides with the submental skin fold for good esthetic results. In general, the submental flap is flexible in size to accommodate resected lesions. Among 3 patients, the flap was taken with a 30–60mm length, ensuring aesthetics after extensive resection of tumors in the oral cavity. In Chow's study, the largest flap was obtained with a length of 12cm and was reconstructed after cheek cancer resection and there was no subsequent flap necrosis.²⁰ Faisal also used the submental flap in plastic surgery for 8 cases with tumor removal in combination with mandibulectomy. The flaps were not necrotic and ensured the function of speech and swallowing.²¹

We analyzed the flap status based on whether the flap was alive, completely or partially necrotic. All three cases of flap reconstruction were alive; none of the patients had partial necrosis of the flap. The postoperative hospital duration was 10–12 days, corresponding to the flap recovery and gastric tube removal time, with no patient staying more than 2 weeks after surgery.

In surgery for cancer of the oral floor, the ideal goal is extensive resection of the tumor, but it is necessary to ensure the aesthetics and function postoperatively. Preservation of speech and swallowing function is essential to ensure the patient's quality of life later in life. After surgery, 3 patients had normal speech and swallowing. In our cases, there were no cases of drooping mouth due to damage to the mandibular nerve during surgery.

Conclusion

In oral cancer surgery, the submental flap is a safe, effective material with a low complication rate, accompanied by good aesthetic and functional results. This technique has a high success rate and is the ideal surgical choice for defects in the oral cavity.

Ethics Approval and Consent to Participate

The case reports received approval for publication from the Ethics Committee of Hue Central Hospital (Hue city, Vietnam).

Consent for Publication

Written informed consent for publication of the clinical details and clinical images was obtained from the patients.

Disclosure

Authors declare no conflicts of interest.

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