

## RECONSTRUCTION OF TONGUE DEFECT WITH SUBMENTAL FLAP AFTER TUMOR RESECTION

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### ABSTRACT

**Objectives:** This study aims to evaluate the effectiveness of the reconstruction of tongue defects with submental flap after tumor resection.

**Methods:** This is a retrospective and prospective study for 12 patients diagnosed with tongue cancer who underwent extensive tumor resection and reconstruction of tongue defects with submental flap at the Center for Craniofacial and Plastic Surgery - 108 Military Central Hospital, from January 2019 to March 2022. **Results:** The study included 10 male patients (83.3%) and 2 female patients (16.7%), with an average age of 54.83. The average size of the defect is 54.4x30.2mm. The submental flap for reconstruction had an average size of 69.6x39.6mm. After surgery, the survival rate of the flap was 100%, partial necrosis was 7.1%, damage to the mandibular branch was 7.1%. Resumption of completely normal speech function accounted for 66.7%, normal diet accounted for 58.4%, no patient had completely lost speech or swallowing function. **Conclusion:** The submental flap has many advantages in reconstructing tongue defects after small-size tumor resection, including simple technique and suitable size. Reconstructive results show the good restoration of the patients' speech and swallowing functions.

**Key words:** *Submental flap / tongue reconstruction/ tongue defect*

### I. INTRODUCTION

Oncologically sound resection of tumors of the tongue results in challenging soft

tissue defects because of its adverse effects on speech articulation, swallowing, and eventually quality of patient's life. Reconstructive surgery of tongue defect allows maximal function restoration and helps to maintain proper quality of life. Options of reconstruction vary from close direct to local flaps and free flaps.

The submental artery island flap (SAIF) was originally described by Martin et al in 1993 to reconstruct facial defects with the advantage of being similar in color to the recipient skin[1]. Three years later, Sterne et al. described the use of SAIF in the reconstruction of the oral cavity after tumor resection. Subsequently, SAIF has been shown to be a reliable reconstructive option for the reconstruction of small and medium head and neck defects [3].

In Vietnam, there have been reports on the use of the submental flap in the reconstruction of defects in the oral cavity. We find that there are currently no reports focusing on lingual defect reconstruction using SAIF. Therefore, we conducted this study with the aim of evaluating the effectiveness of the reconstruction of tongue defects after tumor resection with a submental flap.

### II. MATERIALS AND METHODS

#### 2.1. Materials

A total of 12 patients diagnosed with tongue cancer underwent extensive tumor resection and reconstruction of tongue defects with submental flap at the Center for Craniofacial and Plastic Surgery - 108

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Military Central Hospital, from January 2019 to March 2022.

## 2.2. Methods

2.2.1. Study design: Retrospective and prospective description

2.2.2. The method of data collection

Patient data collection includes:

- Age, gender, time of disease detection, clinical symptoms, tumor location and size, disease stage.

- Surgical information: location, defect size, surgical scope, lymph node dissection range, flap size, flap removal, intraoperative complications.

- Early results after surgery: postoperative complications, flap status, flap removal location

- Evaluation of rehabilitation (speech function, eating, swallowing), aesthetic at 3-6 months after surgery.

### Surgery procedure

The patient got general anaesthesia.

Step 1: Add local anaesthetic to the area of the tongue. Cut at least 1cm wide from the edge of the tumor. Immediate biopsies of the sectional area. Determine the size of the defect.

Step 2: Design a submental flap on the same side of the defect with a length that was about 1cm wider than the defect in each direction. The upper edge of the mandibular margin flap was about 1cm. Dissection of the submental flap, including the skin, subcutaneous tissue and platysma, submental artery and vein.

Step 3: dredge the cervical lymph nodes, remove the salivary glands according to the scope of surgery. Create a tunnel through the oral floor. Insert the submental flap through the tunnel into the oral cavity.

Step 4: Place negative pressure drainage into the submandibular area. Suture the flap to the defect with Vicryl 3.0. The donor site was closed directly with Vicryl 3.0 and Nylon 6.0.



**Fig. 1.** A: Right tongue tumor. B: Flap design. C: flap was dissected. D: reconstruction of the tongue defect.

III. RESULTS

A total of 12 patients required surgical removal of tongue tumor and reconstruction with a submental flap. The study included 10 male patients (83.3%) and 2 female patients (16.7%) with a mean age of 54.83 (min 45, max 66). There were 7 cases of tumor located on the right tongue, 5 cases on the T tongue. The average width of the defect was 30.2mm (min 25mm, max 35mm), the average length was 54.4mm (min 50mm, max 65mm).

All patients underwent cervical lymphadenectomy from D1-D2, submandibular gland resection on ipsilateral submandibular gland. The ipsilateral

submental flap used for reconstruction had an average width of 39.6mm (min 35mm, max 45mm) and average length of 69.6mm (min 60mm, max 80mm). Postoperative results included 11 total survival flaps, 1 partial necrosis flap at the distal end of the flap and 1 patient having damage to the mandibular branch.

Results of functional testing at 3 to 6 months are shown in Table 2. In which, normal speed patients accounted for 66.7%, normal diet 58.4%. No patient had a complete loss of speech or swallowing function.

*Table 1.* Demographic and clinical data

Case	Age (Years)	Sex	Site	Size defect (mm)	Stage	Size flap (mm)	Complication
1	50	male	Right	50x30	pT2N1M0	60x40	Non
2	47	male	Right	50x33	pT2N0M0	70x45	Damage to the mandibular branch
3	60	male	Left	55x27	pT2N1M0	80x35	Non
4	45	male	Right	50x32	pT2N2M0	70x40	Non
5	58	male	Right	50x30	pT2N1M0	60x40	Non
6	62	female	Left	50x35	pT2N0M0	60x40	Non
7	63	male	Right	65x30	pT2N1M0	80x40	Non
8	52	female	Left	55x28	pT2N0M0	70x35	Non
9	51	male	Right	58x30	pT2N0M0	75x40	Non
10	66	male	Left	50x32	pT2N1M0	70x45	Non
11	55	male	Left	65x30	pT2N0M0	80x40	Partial Necrosis
12	49	male	Right	55x25	pT2N0M0	70x35	Non

*Table 2:* Functional Outcome 3 months after surgery

Variable		N (12)	% (100)
Diet	Normal diet	7	58.4
	Minimal restrictions	4	33.3
	Mechanical soft	1	8.3
	Liquid only	0	0
	Gastrostomy tube	0	0
Speech	Normal	8	66.7
	Occasional misarticulation	3	25.0
	Frequent misarticulation	1	8.3
	Unintelligible	0	0

## IV. DISCUSSION

According to the principle of surgical oncology, it is necessary to cut the lesion wide to ensure that there are no cancerous cells but the reconstruction of the defect becomes more difficult. Therefore, free flaps are considered the main option for reconstruction of most defects after head and neck tumor resection [5] [6]. However, defect reconstruction surgery with free flaps is complicated, time-consuming, expensive with high failure rate and complications after surgery, which can leave sequelae at the site of flap removal. The patient must be in good health to endure the lengthy surgery. In some patients detected at an early stage whose tumor is not too large, local small skin flaps may be sufficient to regenerate the defect. The local and regional flaps have the advantage of simple technique and suitable structure for the recipient site.

To reconstruct small and medium defects in the oral cavity, the submental flap is considered by many authors to have many advantages [1] [3] [6] such as size, color, suitable structure, and simple technique. The donor site could be sutured directly and the submental scar is invisible. The submental flap is an axial pattern flap based on the submental artery, which is a branch of the facial artery, and is composed of skin, subcutaneous tissue, and platysma. It is possible to take a submental flap with the size of 11x6cm while still suturing and closing it directly [7]. In the literature, the largest flap skin paddle was 15x9cm without necrosis[6].

In our study, the flap was taken with an average size of 69.6x39.6mm, our largest flap size for reconstruction was 80x45mm.

The patients selected for submental flap in the study all had localized lesions that did not exceed ½ of the tongue, the overall tumor size was pT2, and our flap size met the needs of defect reconstruction. We only encountered 1 case of necrosis of the distal flap with a small size of less than 1/10 of the flap area. In this case, we removed the necrotic part and sutured it 10 days after surgery. We had one case of another complication encountered in the study, which was nerve damage to the mandibular margin during surgery.

During the surgical procedure, we performed a flap dissection to isolate the vascular peduncle of the flap, then dissected the lymph nodes and cut the submandibular salivary glands. We performed in such order to avoid maximum damage to the vascular pedicle of the flap. According to such a procedure, the survival rate of flap in our study is 100% (partial necrosis is 8.3%). The survival rate of flaps in the studies varies from 71- 93.3% (the rate of partial necrosis is from 6.7-15%)[8] [9] [10].

Assessing function after surgery from 3-6 months, we found that 58.4 people eat and drink normally and all other patients could eat and drink. No patient could not swallow and had to put a gastrotonomy tube in. Test of speech function showed that the rate of patients speaking normally is 66.7%, all patients could speak understandably. This result is similar to the study of Chow and Ramirez [9] [10].

The disadvantage of this study is that it has not been able to track long-term outcomes. Aesthetic results have not been evaluated due to the short duration.



V. CONCLUSION

The submental flap has many advantages in reconstructing tongue defects after small-size tumor resection, including simple technique and suitable size. Reconstructive results show the good restoration of the patients' speech and swallowing functions.

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