J. Maxillofac. Oral Surg. (July–Sept 2019) 18(3):428–431
https://doi.org/10.1007/s12663-018-1123-2

ORIGINAL ARTICLE

Tongue Flap Reconstruction in Carcinoma of Oral Cavity: An Institutional Experience

Vijay Kumar[1] · Sourabh Mukharjee[1] · Naseem Akhtar[1] · Shiv Rajan[1] · Arun Chaturvedi[1] · Sanjeev Misra[2] · Sameer Gupta[1] · Puneet Prakash[1] · Satyabrata Das[1]

Received: 24 March 2018 / Accepted: 11 May 2018 / Published online: 15 May 2018

Abstract
Introduction Abundant blood supply of tongue permits various flap designs and makes it a good choice for reconstructing defects following resection of oral cancer.
Aim We aim to evaluate the reliability of tongue flap for small- and medium-size defects after resection of oral cancer in terms of viability, complications, and functional outcome.
Methods In this retrospective analysis, patients reconstructed with lateral tongue flaps after resection of oral cavity carcinoma from May 2011 to December 2017 were included.
Results Forty-two patients underwent tongue flap reconstruction during the study period. Median size of defect was 3.5 cm. Out of 42 patients, 27 had carcinoma of buccal mucosa and 8 had carcinoma of lower alveolus. Mandibular resection was performed in 30 patients. Neck was addressed in all 42 patients. Supraomohyoid neck dissection was done in 12 patients, while others had comprehensive neck dissection. Average time to harvest flap was 25 min. There was no flap loss in the postoperative period. Three patients each developed flap tip necrosis and minor orocutaneous fistula that were managed conservatively. Subjective functional outcome was good to satisfactory in most patients (88%).
Conclusion Lateral tongue flap is a simple reliable flap for reconstruction of small- and medium-sized defects following resection of oral cavity cancers in terms of low morbidity and satisfactory functional outcomes. It obviates the need of distant tissue transfer.

Keywords Oral cavity carcinoma · Oral cavity reconstruction · Tongue flaps · Local flaps

Introduction

Oral cancer is the most prevalent malignancy among Indian males [1]. Worldwide, the highest number of oral cancers with up to 80,000 new cases is diagnosed annually in India [2]. It accounts for up to one-third of all tobacco related cancers in India [3]. Excision of the primary and neck dissection is the mainstay of surgical treatment in most cases [4]. Appropriate reconstruction of the defects and early healing is the key to timely delivery of adjuvant treatment and improved quality of life. Soft tissue reconstruction for maintaining oral cavity integrity and function is a challenging task. Various reconstructive modalities are available to address this situation ranging from local flaps to free tissue transfer. Local flaps such as tongue flap or nasolabial flaps are good alternatives, especially for small- or medium-size defects.

Tongue is a versatile organ which has been used for providing tissue for reconstruction of oral cavity following resections of oral cancer [5, 6]. Its abundant blood supply permits different flap designs according to the anatomy of the defect. Tongue flap can be a feasible alternative to the technically demanding gold-standard free flap in reconstruction of small- and medium-size defects following oral cavity resections.

Potential disadvantage of the tongue flap could be some difficulty in deglutition and speech experienced by some patients.

✉ Naseem Akhtar
naseemakhtar97@gmail.com

[1] Department of Surgical Oncology, King George's Medical University, Lucknow, India

[2] AIIMS, Jodhpur, Jodhpur, India

Though this flap has been described and used for several decades, there is not much experience published in the literature. With the advent of pedicled, locoregional and free flaps, the tongue flaps has been largely ignored.

This study was done to evaluate the reliability of tongue flap for reconstructing small- and medium-size defects following resection of oral cancer. We have studied the viability, complications, and functional outcome of tongue flaps.

Materials and Methods

This was a retrospective study done in a tertiary care center from north India. Tongue flap reconstruction was done in 42 patients following surgical resection of carcinoma oral cavity in our department from May 2011 to December 2017. Tongue flaps were used for the reconstruction of the carcinoma of buccal mucosa, lower and upper alveolus, retromolar trigone, and floor of the mouth.

The demographic profiles of the patients, site and stage of the tumors, type of resection for primary as well as type of neck dissections were reviewed along with the postoperative complications. Postoperative functional outcome was assessed subjectively using a verbal questionnaire, rating outcomes of speech and swallowing as poor, satisfactory, and good.

Surgical Technique: Approximately 1-cm thick lateral tongue flap is raised. Anteriorly we start 1 cm posterior to tip and extend posteriorly up to circumvallate papilla. Dimension of the flap varies from 2.5 × 5 to 4 × 5 cm. Flap is rotated along its long axis to the defect site and sutured with interrupted absorbable suture. Remaining tongue is closed primarily (Figs. 1, 2, and 3).

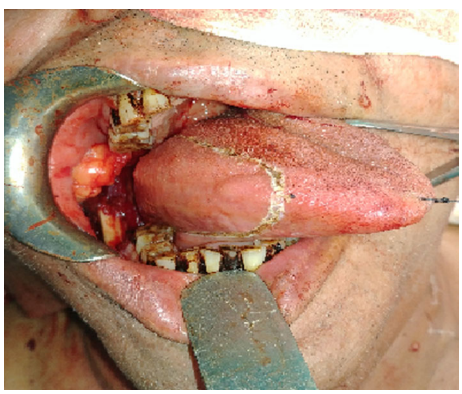

Fig. 1 Marking of tongue flap

Fig. 2 Elevated tongue flap

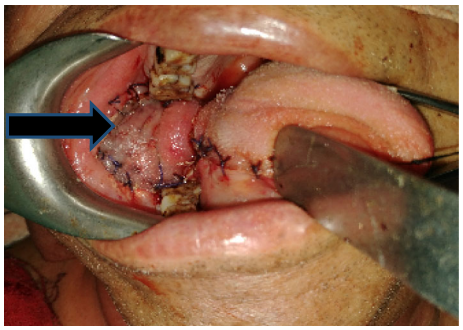

Fig. 3 Tongue flap sutured to defect

Results

There were 24 male and 18 females (Male/Female = 4:3). Median age was 45 years (range 25 to 80 years). Buccal mucosa was the most common site (27 patients, 64.28%). Table 1 shows the site distribution.

Resection included segmental mandibulectomy (18 patients), marginal mandibulectomy (12 patients), and upper alveolectomy (5 patients). Bite composite resection was performed in two patients. There was no bony resection in five patients.

In addition to resection of the primary tumors, modified radical neck dissection was done in 25 patients and supraomohyoid neck dissection in 12 patients, and 5 patients underwent radical neck dissection.

Median size of defect following resection was 3.5 cm. Lateral tongue flap was raised to cover the surgical defect. The average time for flap elevation was 25 min.

No major postoperative complication or mortality was encountered. There was no flap loss. Three patients had flap tip necrosis. Another three patients developed orocutaneous fistula and two patients developed minor postoperative bleeding from the flap site. All were managed successfully by conservative management.

Most patients (88%) had adequate mouth opening (Fig. 4) and good mobility of tongue. Functional outcomes (swallowing and speech) were rated as good in 71.42% patients.

Table 1 Showing the demography and the procedures performed

Total numbers of patients	42 (*n*)
Age of the patients	25–80 years (median—45 years)
Male/Female	4:3 (24 males and 18 females)
T Stage	
T 1	21 (50.00%)
T 2	14 (33.33%)
T 3	03 (7.1%)
T 4	04 (9.4%)
Primary site of tumor	
1. Buccal mucosa	27 (64.28%)
2. Lower alveolus	08 (19%)
3. Floor of mouth	03 (7.1%)
4. Retro molar trigone	02 (4.7%)
5. Upper alveolus	02 (4.7%)
Bony resection	
1. Segmental mandibulectomy	18 (42.85%)
2. Marginal mandibulectomy	12 (28.57%)
3. Upper alveolectomy	05 (11.9%)
4. Bite composite resection	02 (4.76%)
5. No bony resection	05 (11.9%)
Neck dissection	
1. Modified radical neck dissection	25 (59.52%)
2. Supraomohyoid neck dissection	12 (28.57%)
3. Radical neck dissection	05 (11.90%)
Median surgical defect	3.5 cm
	2.5—5.0 cm (range)
Average time to elevate flap	25 min

Fig. 4 Flap after 6 months

Postoperative complications and correlation of functional outcomes of the procedures are shown in Tables 2 and 3.

Table 2 Postoperative complications and functional outcome

Total Patients	*n* = 42
Postoperative complications	
1. Tip necrosis	03 (7.1%)
2. Orocutaneous fistula	03 (7.1%)
3. Bleeding	02 (4.7%)
4. Total flap loss	None
Overall cosmesis	
1. Good	25 (59.52%)
2. Satisfactory	12 (28.57%)
3. Poor	05 (11.91%)
Functional results:	
(Deglutition and speech)	
1. Good	30 (71.42%)
2. Satisfactory	07 (16.67%)
3. Poor	05 (11.90%)

Table 3 Correlation of defect size with functional outcome

Defect size (cm)	Functional outcome		
	Good	Satisfactory	Poor
< 2	25	5	0
2–4	5	1	0
> 4	0	1	5

Discussion

Reconstruction is an integral part of the surgical treatment of oral cancer. Appropriate reconstruction is essential not only for cosmesis and functional outcome but is also essential for early healing and initiation of adjuvant radiotherapy. The choice of reconstruction depends upon the size and nature of defect and the expertise available to reconstruct it. Every patient cannot be offered free flaps because of lack of expertise and increased operating time [6]. Local flaps like tongue flap can be used for small-to-moderate size defects with good results.

Lexer described the lateral tongue flap for retromolar trigone and tonsilar area in 1909 [7]. Klopp and Schurter popularized posterolateral tongue flap for cancers of soft palate and tonsillar area [8]. S Kannan published their data with tongue flap reconstruction in 22 patients with carcinoma of buccal mucosa [9]. In our series the most common primary site was carcinoma buccal mucosa in 27 (64.28%) patients.

Tongue flap can be used without any adverse outcome to cover the exposed bone after marginal mandibulectomy. We used tongue flap reconstruction after marginal mandibulectomy in 12 patients with no morbidity and good functional outcome. Som and Nussbaum [10] described the use of a lateral tongue flap for reconstruction of the floor of the mouth after marginal mandibulectomy. The authors reported its use in 16 patients with good results and minimal functional morbidity.

The advantage of tongue flap is that it is easy and quick to harvest. In our series, it took an average of 25 min to harvest the flap which is almost the same as other series [7].

Calcaterra [11] reported no flap loss after reconstruction with tongue flap. There was no flap loss (partial or total) in the series published by Kannan et al. [9]. In our series, there was no major flap loss in the postoperative period. Three patients had flap tip necrosis and another three developed minor orocutaneous fistula. Two patients had minor bleeding from flap which was managed conservatively.

The disadvantage of tongue flap is the possibility of alteration of speech and swallowing due to the division of tongue, impaired mobility and scarring. However, most patients (71.42%) in our study had adequate mouth opening, good mobility of tongue, and good speech.

Conclusion

A single-stage tongue flap is a simple and reliable method for reconstruction of defects, up to 3–4 cm in size, following resection of oral cancers. The flap is completely intraoral and provides good functional results with low morbidity. This flap is well suited for patients with marginal mandibulectomy and buccal mucosa defects.

Compliance with Ethical Standards

Conflict of interest The authors declare that they have conflict of interest.

References

1. Singh V, Husain N, Akhtar N, Kumar V, Tewari S, Mishra S et al (2015) Do human papilloma viruses play any role in oral squamous cell carcinoma in North Indians? Asian Pac J Cancer Prev 16:7077–7084
2. Akhilesh K, Shraddha S, Kumar V, Pal US (2015) Molecular concept in human cancer. National Journal of Maxillofacial Surgery 6(1):9–15
3. Misra S, Chaturvedi A, Misra NC (2008) Management of gingivobuccal complex cancer. Ann R Coll Surg Engl 90:546–553
4. Kumar V, Sindhu VA, Rathanaswamy S, Jain J, Pogal RJ, Akhtar N et al (2013) Cancers of upper gingivobuccal sulcus, hard palate and maxilla: a tertiary care centre study in North India. Natl J Maxillofac Surg 4(2):202–205
5. Donald G, Douglas D, Joseph H (1975) Tongue flap reconstruction in cancer of the oral cavity. Arch Otolaryngol 101(3):166–169
6. Vaughan ED, Brown AE (1983) The versatility of the lateral tongue flap in the reconstruction of defects of the oral cavity. Br J Oral Surg 2(1):1–10
7. Lexer E (1931) Die gesamte Wiederherstellungs chirurgie, vol I. Barth, Leipzig, pp 240–243
8. Klopp CT, Schurter M (1956) The surgical treatment of cancer of the soft palate and tonsil. Cancer 9:1239–1243
9. Chaukar D, D'Cruz A, Deshmukh A, Kannan S, Thakkar P, Yadav P (2013) Tongue flap revisited. J Cancer Res Ther 9(2):215–218
10. Som M, Nussbaum M (1971) Marginal resection of the mandible with reconstruction by tongue flap for carcinoma of the floor of the mouth. Am J Surg 121:679–683
11. Calcaterra TA (1983) Laterally based tongue flap for the reconstruction of the pharyngeal defects. Arch Otolaryngol 109:750–752