

# To study the usefulness of islanded tongue flap reconstruction for carcinoma buccal mucosa defect



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## ABSTRACT

**Background:** Carcinoma buccal mucosa is very prevalent among the Indian population. The mainstay of treatment is surgical excision, which leaves tissue defects requiring reconstruction. Various techniques and flaps have been used for reconstruction of such defects, and research is still underway for better cosmesis and functional outcomes.

**Aims and Objectives:** The aims of this study were to assess the usefulness of an islanded tongue flap in buccal mucosa cancer defect reconstruction after segmental mandibulectomy.

**Materials and Methods:** The present hospital-based observational study was conducted on patients with carcinoma buccal mucosa, with an age greater than 20 years and both sexes included after obtaining written and informed consent. The patients underwent islanded tongue flap reconstruction after wide local excision of tumor and segmental mandibulectomy.

**Results:** Twenty-four patients underwent the procedure and were included in this study. The outcome of the surgery was compared in terms of deglutition and difficulty in speech on a scale of good, satisfactory, and poor. The cosmetic outcome was also compared in the same way. During the post-operative period, eight (33.33%) patients developed early complications of hematoma and pus discharge. Three (12.5%) developed wound dehiscence. Two (8.33%) of these patients also developed flap necrosis. All these complications were managed conservatively. Overall, the surgery had a good cosmetic outcome with minimal difficulty in deglutition or speech. **Conclusion:** Based on results, an islanded tongue flap can be regarded as a good alternative for small and medium-sized buccal mucosa cancer defect reconstruction after segmental mandibulectomy.

**Key words:** Carcinoma buccal mucosa; Islanded tongue flap; Segmental mandibulectomy

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## INTRODUCTION

Oral cancer is the most prevalent malignancy among Indian males. Worldwide, the highest number of oral cancers, with up to 80,000 new cases, is diagnosed annually in India.<sup>1</sup> It accounts for approximately one-third of all tobacco-related cancers in India.<sup>2,3</sup> Carcinoma buccal mucosa is a subpart of carcinoma of the oral cavity. It is also termed inner cheek cancer, as it occurs in the thin, flat cells called squamous cells that line the inner cheek or buccal mucosa. The mainstay of treatment remains wide local surgical excision of the tumor. In cases of mandible involvement, a mandibulectomy also needs

to be done. This leaves both soft-tissue buccal mucosa and mandibular defects in these patients. Appropriate reconstruction plays an important role in improving the quality of life of these patients and is a vital step in the management of malignancies of the oral cavity. A free flap remains the gold standard for reconstruction of such defects after segmental mandibulectomy. Free flap reconstruction is a cumbersome procedure requiring a lot of expertise. The tongue is a versatile organ that has been used in the past to provide tissue for the reconstruction of oral cavity defects. Its abundant blood supply permits different flap designs according to the anatomy of the defect. A tongue flap can be a feasible alternative to

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the technically demanding gold-standard free flap in the reconstruction of small and medium-sized defects following buccal mucosa resections after segmental mandibulectomy.

## AIMS AND OBJECTIVES

1. To assess the usefulness of islanded tongue flap reconstruction for carcinoma buccal mucosa defect on the basis of cosmesis.
2. To assess the usefulness of islanded tongue flap reconstruction for carcinoma buccal mucosa defect on the basis of deglutition and speech.

## MATERIALS AND METHODS

The present hospital-based observational study was conducted on patients with carcinoma buccal mucosa admitted to the Department of General Surgery, LLR and Associated Hospitals, GSVM Medical College, Kanpur, from December 2019 to October 2021 after obtaining written and informed consent from the patient or their relatives. The criteria for the selection of patients were as follows:

The following criteria were included in the study:

1. Buccal mucosa lesions  $\leq 4$  cm\*
2. Buccal mucosa lesions requiring segmental mandibulectomy
3. Age between 20 and 70 years\*
4. Completed written informed consent form acknowledging awareness of alternative treatments and risks involved
5. Ability to return for scheduled follow-up examinations.

The following criteria were excluded from the study:

1. Buccal mucosa lesions invading adjacent structures\*\*\* (excluding mandible)
2. Buccal mucosa lesion more than 4 cm\*
3. Post-radiotherapy lesions
4. Metastatic lesions
5. Any comorbidities that may impair wound healing, such as uncontrolled Diabetes mellitus, Uncontrolled Hypertension, hepatic, renal, or any immunological disorder.

\*Based on clinical examination, size of lesion in the greatest dimension

\*\*Only a few cases of oral cancer have been noticed in adolescents, and most patients after 70 years of age are surgically unfit due to comorbidities of old age

\*\*\*Maxillae, deep muscles of the tongue, maxillary sinus, skin of the face, masticator space, and pterygoid plates.

Twenty-four patients came to us with a buccal mucosal lesion. All patients had scrap cytology done previously, which confirmed the diagnosis of carcinoma of the buccal mucosa. A detailed clinical questionnaire was used to take relevant histories and conduct a clinical examination of the patients. A CT face and neck was done to know the local and nodal extent of the disease. X-ray of the chest and USG of the whole abdomen ruled out malignancy.

Routine blood investigations such as hemograms, kidney function tests, blood sugar tests, liver function tests, and serum electrolytes were done to rule out other comorbidities and assess the surgical fitness of the patient.

All patients included in the study underwent an ipsilateral neck dissection followed by a segmental mandibulectomy followed by wide local excision of the tumor. A defect size ranging from 1 cm to 4 cm was left after the procedure.

The islanded tongue flap reconstruction technique was used in this study.

The islanded tongue flap is a pyramidal-shaped flap raised on the same side of the tongue as the defect based on a pedicle of the perforator of the deep lingual artery. The flap was used to cover both the exposed bone and the cheek defect. The remaining tongue was closed primarily with an interrupted absorbable suture.

The patients were discharged after stitch removal on 7<sup>th</sup> post-operative day. A close follow-up at the post-operative 15<sup>th</sup> and 30<sup>th</sup> day is done, and thereafter, a monthly follow-up is advised. The outcome of reconstruction in terms of cosmesis, deglutition, and speech was assessed at a 3-month follow-up. The outcome was based on the patient's own subjectiveness and divided into a good, satisfactory, or poor outcome.

## Ethics

The study was approved by the Ethics Committee, of GSVM Medical College, Kanpur (EC/BMHR/2021/54, Dated June 29, 2021) and the Helsinki Declaration of 1975, as revised in 1983.

## RESULTS

A total of 24 persons participated in the study.

Table 1 shows the distribution of cases according to size of lesion in the greatest dimension based on clinical examination. It was found that among the 24 cases, 04 (16.66%) lesions were  $\leq 2$  cm in size, and 20 cases (83.33%) were larger than 2 but  $\leq 4$  cm.

**Table 1: Distribution of cases according to size of lesion**

| Size of lesion  | Number of cases | Percentage |
|-----------------|-----------------|------------|
| ≤2 cm           | 04              | 16.66      |
| >2 cm and ≤4 cm | 20              | 83.33      |
| Total           | 24              | 100        |

**Table 2: Distribution of cases according to neoadjuvant chemotherapy received and not received by the patients**

| Neoadjuvant chemotherapy status | Number of cases | Percentage |
|---------------------------------|-----------------|------------|
| Received                        | 06              | 25         |
| Not received                    | 18              | 75         |
| Total                           | 24              | 100        |

Table 2 shows that out of 24 cases in our study, six cases had received neoadjuvant chemotherapy and 18 cases had not received neoadjuvant chemotherapy.

Table 3 shows that, among all the selected carcinoma buccal mucosa cases, supraomohyoid neck dissection was done in 19 cases (79%) and modified radical neck dissection was done in five cases (20.83%).

Table 4 shows the distribution of early complications after reconstruction. Among the total 24 cases, 8 (33.33%) had early complications in our study in the form of hematoma formation, pus discharge, or both. Four (16.66%) patients had only hematoma formation, two (8.33%) had only pus discharge, and two (8.33%) patients had both hematoma formation and pus discharge. Overall, in our study, 6 (25%) patients had hematoma formation, while 4 (16.66%) patients had pus discharge.

Table 5 shows the distribution of late complications after reconstruction. Three patients developed wound dehiscence; two of these patients also developed Flap necrosis; and no patient developed an Oro cutaneous fistula in our study.

Table 6 shows the cosmetic outcome in cases after reconstruction on a scale of good, satisfactory, and poor. Twenty (83.33%) cases had good cosmesis, three (12.5%) had satisfactory cosmesis, and only one (4.16%) case had a poor cosmetic outcome.

Table 7 shows the outcome after surgery in terms of deglutition and speech on a scale of good, satisfactory, and poor. Twenty-one (87.5%) cases out of 24 had a good outcome, two (8.33%) had a satisfactory outcome, and only one case had a poor outcome in terms of deglutition and speech.

**Table 3: Distribution of cases with neck dissection and without neck dissection**

| Type of neck dissection | Number of cases | Percentage |
|-------------------------|-----------------|------------|
| SOND                    | 19              | 79.16      |
| MRND                    | 05              | 20.83      |
| Total                   | 24              | 100        |

SOND: Supraomohyoid neck dissection, MRND: Modified radical neck dissection

**Table 4: Distribution of early complications after reconstruction**

| Early complication | Number of cases | Percentage |
|--------------------|-----------------|------------|
| Hematoma           | 06              | 25         |
| Pus discharge      | 04              | 16.66      |

**Table 5: Distribution of late complications after reconstruction**

| Late complication     | Number of cases | Percentage |
|-----------------------|-----------------|------------|
| Flap necrosis         | 02              | 8.33       |
| Wound dehiscence      | 03              | 12.5       |
| Oro cutaneous fistula | 00              | 00         |

**Table 6: Distribution of cases according to overall cosmesis**

| Outcome      | Number of cases | Percentage |
|--------------|-----------------|------------|
| Good         | 20              | 83.33      |
| Satisfactory | 03              | 12.5       |
| Poor         | 01              | 4.16       |
| Total        | 24              | 100        |

**Table 7: Distribution of cases according to deglutition and speech**

| Outcome      | Number of cases | Percentage |
|--------------|-----------------|------------|
| Good         | 21              | 87.5       |
| Satisfactory | 02              | 8.33       |
| Poor         | 01              | 4.16       |
| Total        | 24              | 100        |

## DISCUSSION

Carcinoma Buccal mucosa cancer is the most common oral cavity cancer in India.<sup>3</sup> These cancers are known to be associated with high mortality and morbidity.

In our study, 14 were male patients and 10 were female patients. This data shows a male predominance in the occurrence of buccal mucosa carcinoma in this region, with a proportion of 1.4:1 (male: female). Similarly, one of the studies from Kerala reported a 2.2:1 (male: female) ratio.<sup>1</sup> This high proportion of oral cancers in males may be attributed to the increased risk of tobacco chewing in

India.<sup>2</sup> Tobacco chewing in the form of gutka, khaini, or mawa was found in the personal histories of all patients. In this study, the youngest patient was 22 years old, while the oldest was 62 years old. The mean age of patients was 40.83. In the present study, all the participants (100%) had squamous cell carcinoma, and none of the participants were identified with verrucous carcinoma or basaloid squamous cell carcinoma varieties.

Oral cavity defects following oncological surgery are complex. Nowadays, these defects are being increasingly reconstructed with free flaps. On the other hand, free flaps need an expert in microvascular anastomosis. Furthermore, the need for anastomosis increases the operating time. Vigilant monitoring of flaps is needed in the initial post-operative period. In developing countries, every patient cannot be offered free flaps due to increased cost, lack of expertise, increased operating time, and anesthetic constraints in old age.<sup>4</sup> Moreover, free flaps are not without donor site morbidity.

Local flaps, like tongue flaps, can be used for small to moderate-sized defects with good results. Lexer described the lateral tongue flap for the retromolar trigone and tonsillar area in 19094. Klopp and Schurter popularized the posterolateral tongue flap for cancers of the soft palate and tonsillar area.<sup>5</sup> Chaukar et al., published their data on tongue flap reconstruction in 22 patients with carcinoma of the buccal mucosa.<sup>6</sup> A tongue flap can be used as a reliable flap without any adverse outcome to cover the exposed bone after mandibulectomy. Som and Nussbaum<sup>7</sup> 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.

In our study, four patients had lesions of size  $\leq 2$  cm, while 20 patients had buccal lesions of sizes  $>2$  cm and  $\leq 4$  cm. In this study, all patients had mandible involvement and required ipsilateral segmental mandibulectomy. Neck dissection was planned based on nodal staging. Modified radical neck dissection was done in five patients, and supraomohyoid neck dissection was done in 19 patients. The mean size of the tumor lesion was 2.64 cm. The defect after the resection procedure varied between 1 cm and 4 cm among the 24 participants. Reconstruction using an islanded tongue flap was done in all patients. No major post-operative complication or mortality was encountered in our study. Eight (33.33%) cases had early complications in our study in the form of hematoma formation, pus discharge, or both. Four (16.66%) patients had only hematoma formation, two (8.33%) had only pus discharge, and two (8.33%) patients had both hematoma formation and pus discharge. All were managed successfully by conservative management.

The advantage of a tongue flap is that it is easy and quick to harvest, requiring comparatively less expertise and operating time. The main concern with tongue flaps is an alteration of speech and swallowing. Some surgeons fear that removal of the tongue tissue may interfere with articulation and deglutition; this fear is unwarranted based on our observation. In our study, 21 (87.5%) cases had good functional outcomes (speech and deglutition), 2 (8.3%) cases had satisfactory outcomes, and only 1 (4.16%) case had a poor outcome. Kumar et al., in 2018, studied the feasibility of lateral tongue flaps in oral cavity cancers and also found a good functional outcome in terms of deglutition and speech in 71.42% of cases and a poor outcome in 11.90% of cases.<sup>8</sup> Speech depends on the mobility of the tongue. Unlike the lateral tongue flap, the floor of the mouth is not included in the islanded tongue flap; hence, tethering or fixation of the tongue does not occur; therefore, speech is not affected. Swallowing mainly depends on the bulk of the posterior third of the tongue. The islanded tongue flap does not cross the circumvallate papillae, so swallowing is not affected. Moreover, we have used an islanded tongue flap, wherein the flap is pedicle-based with no muscular attachment of flap and tongue (primary donor site) and, thus, has better mobility in comparison to other tongue flaps.

There were no major post-operative complications and only some minor complications involved with the islanded tongue flap reconstruction. Calcatera<sup>9</sup> reported no flap loss after reconstruction with a tongue flap. There was no flap loss (partial or total) in the series published by Chaukar et al.,<sup>6</sup> Overall, in our study, 6 (25%) patients had hematoma formation, while 4 (16.66%) patients had pus discharge. Three patients developed wound dehiscence. Only two of these patients developed flap necrosis. All these complications were successfully managed conservatively, and none of the patients developed any orocutaneous fistula or flap loss.

Thus, based on our observations, the islanded tongue flap is a reliable flap in carcinoma buccal mucosa surgery, where bone coverage is required. It can be used for small and medium-sized defects but may not be appropriate for large-sized defects.

#### Limitations of the study

1. Limited sample size.
2. Limited time period for study.
3. The study is limited to lesions  $<4$ cm in size.

#### CONCLUSION

Single- staged islanded tongue flap is a simple and reliable flap for intra-oral reconstruction of small to moderate size

defects. It can be used in a select group of patients with a high risk for prolonged surgery and with bone exposed. It provides good functional results without much morbidity.

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**PS-** Concept and design of the study, prepared first draft of manuscript; **MA-** Interpreted the results; reviewed the literature and manuscript preparation; **SS-** Concept, coordination, statistical analysis and interpretation, preparation of manuscript and revision of the manuscript.

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