



REVISITING AN OLD TECHNIQUE FOR ORAL CAVITY RECONSTRUCTION USING MASSETER FLAP: AN INSTITUTIONAL EXPERIENCE OF 50 BUCCAL MUCOSA CANCER PATIENTS

Oncology

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ABSTRACT

Cancer of the posterior part of oral cavity are often diagnosed at an advanced stage. Although microsurgery and free flaps have better results, the use of local and regional flaps remains an easier, feasible and faster option for reconstruction. We have done a retrospective analysis of 50 patients who underwent, a masseter flap at our institution in our study along with its 6 months follow up and outcomes. This technique offers a quick and reliable method for repairing oral cavity defects in a selected few cases. The masseter flap has an advantage, as it is technically easy, pliable for posterior defects and no significant donor site morbidity while its drawbacks are its limited mobility and small posterior defect alone coverage. It may provide a simple and effective solution in a difficult situation in selective cases.

KEYWORDS

masseter flap, oral cavity cancer, buccal mucosa cancer, oral reconstruction

INTRODUCTION

Lip, oral cavity cancers are the second most common cancers in the Indian subcontinent. Oral cavity and lip cancers affected 354,864 new patients with a case-fatality of 177,384 patients in the year 2018 worldwide. India contributes to global oral cancer burden with 119,992 newly diagnosed patients constituting 10.4% of all new cancer cases (Bray et al., 2018).

High incidence and cluster affect observed in the region is due to the high consumption of chewing "pan," a combination of tobacco, nut, and lime. As per Global Adult Tobacco Survey (GATS 2016-2017, 2017) in India 29.6% of men, 12.8% of women and 21.4% (199.4 million) of all adults currently use smokeless tobacco.

In India, 66.6% patients of head and neck cancers present with locally advanced disease at the time of diagnosis (Mathur et al., 2020).

Among these patients there is a significant delay in presentation for definitive treatment with around 50% presenting in stages III and IV (McGurk et al., 2005).

Surgery forms the mainstay of treatment in oral cancers supplemented by radiotherapy and chemotherapy in selected cases. With the advent of microvascular reconstruction approaches and surgical expertise there have been tremendous advancements in management of oral cavity cancers with optimal restoration of form and function with improved oncologic outcomes. However, all defects do not require a free flap and elderly patients with multiple comorbidities are not ideal candidates for microvascular reconstruction (Deganello et al., 2012). In such situations there is a need to make appropriate use of local flaps to provide optimal results.

Masseter muscle and its innervation play an important role in reanimation of the paralyzed face however are less popular in the reconstruction of oral cavity defects.

The objective of the study is to explore the role of a technically easy, straightforward, local pedicled masseter flap in the era of free flaps and microvascular surgery to reconstruct oral cavity defects in selected patients. We examined a series of 50 patients with previously untreated buccal mucosa cancers staged, operated and followed in a single institute.

MATERIALS AND METHODS

Patient selection – We examined patients with primary squamous cell carcinoma of posterior buccal mucosa and retromolar trigone who were evaluated at Kidwai Cancer Institute between January 2015 and December 2018.

All patients were seen in the outpatient department and detailed patient history regarding their habits of tobacco use elicited. The patients were examined for the presence of trismus, skin involvement, lymph nodes and presence of bone involvement.

In doubtful cases, an orthopantomogram or CT scan of face and neck were performed to look for mandible erosion and destruction, infratemporal fossa involvement. The treatment plan of all patients was decided in multi-disciplinary tumour board. Only patients who underwent surgical treatment with masseter flap reconstruction were included in the study. Data was obtained regarding adjuvant treatment received, postoperative complications and mouth opening at six months. The patients were followed up for a minimum six months in the outpatient department.

Technique –

Masseter is a muscle of mastication with three distinct bellies originating from the zygomatic arch and inserting onto the ramus, angle and body of the mandible. The major blood supply is by the masseteric artery which is a branch of internal maxillary artery with additional supply from facial, superficial temporal and transverse facial artery.

Masseteric artery is not routinely dissected during standard neck dissection, which ensures a robust blood supply of the harvested flap making it perfectly reliable even after previous or concomitant neck dissection.

Venous drainage of the masseter muscle is by the facial vein which flows into the internal jugular vein; in case of previous neck dissection, the pterygoid venous plexus will provide venous drainage if the internal jugular vein is preserved.

Following neck dissection, which was supraomohyoid or modified radical, the primary tumor was approached via the lower cheek flap followed by resection of the primary buccal mucosa tumour with hemi mandibulectomy.

Finally, the operative field was carefully checked, and reconstruction of the oral cavity defect was achieved using masseter muscle flaps. The muscle can be used in part or in whole. If only a portion of the muscle is to be used, the inferior portion of the muscle is marked, and the muscle is released from its mandibular insertion preserving the proximal blood supply (Figure 1). The crucial step is elevation of the parotid gland and terminal branches of the facial nerve from the superficial aspect of the muscle. And releasing the muscle along its posterior margin from the parotid gland. The lateral aspect of the masseter

surface was carefully detached from the buccal flap at a level beneath the masseteric-parotid fascia starting from the lower end of the muscle and ending at its upper end at the zygoma. The muscle is then secured through a series of sutures to the adjacent buccal mucosa.

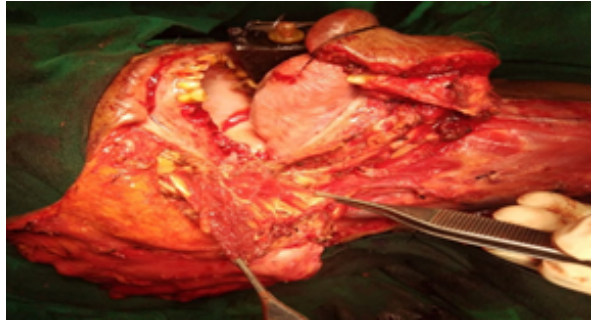


Figure 1: a) Masseter flap harvest superior pedicle with open posterior oral cavity defect (Masseter muscle flap shown by dotted line)

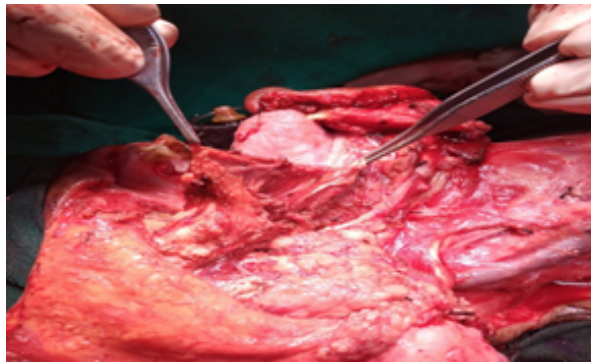


Figure 1 – b) Flap setting in oral cavity defect

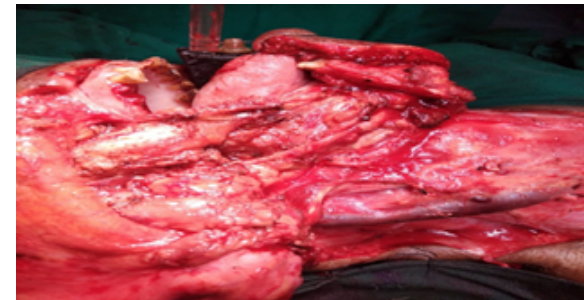


Figure 1: c) Covered defect with flap - post fixation (fixed masseter muscle shown by a dotted line)



Figure 1: d) Mouth opening at 6 months in a similar case

RESULTS

A total of 4004 oral cavity cancer patients were treated at our institute in the study time, out of which 1622 are buccal mucosa cancer patients and only 50 patients with buccal mucosa cancer underwent masseter flap as reconstruction for oral cavity defects between 2015-18 and were included in our study (Flowchart 1).

No patient had been previously treated. Neck dissection, excision of

the primary tumor and marginal or hemi mandibulectomy with masseter flap reconstruction were performed in all cases. The age of the patients in our study ranged from 32 to 72 years with a mean of 57.5 years. Of the total patients, 68% (n = 34) were female. Baseline characteristics of the patients included are summarized in Table 1. Postoperative results along with adjuvant therapy and trismus are shown in Table 2.

Post-operative Adjuvant RT was given in 27 (54%) patients while adjuvant CRT was given in 2 (4%) patients.

Flowchart 1 : Study Flow Diagram For The Period Jan 2015 To Dec 2018

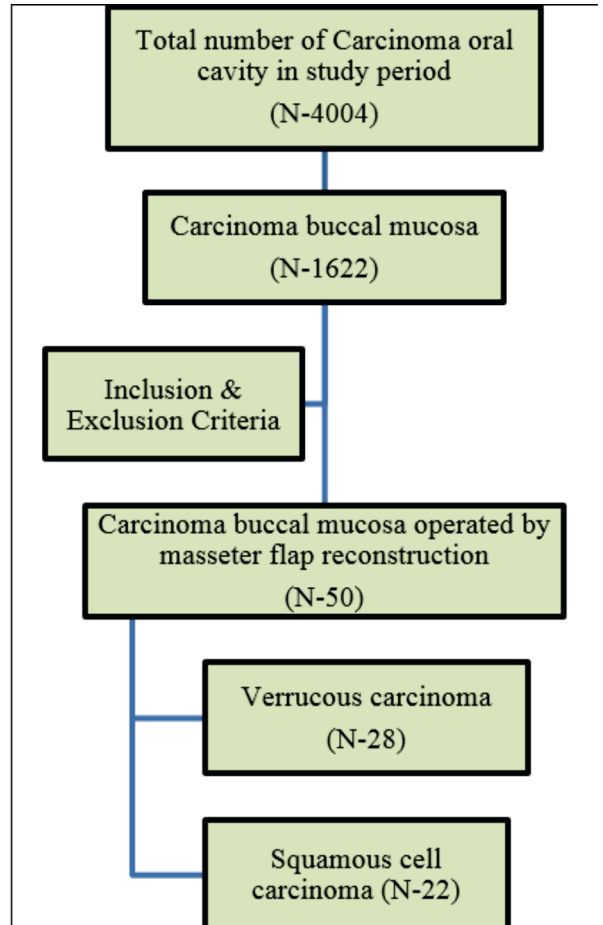


Table 1 Baseline Characteristics Of The Study Population

Characteristics	Number of patients_N (%)	
Sex	Male	16 (32%)
	Female	34 (68%)
Medical comorbidities	Yes	42 (84%)
	No	8 (16%)
Habits	Tobacco use	43 (86%)
	Gutka chewing	36 (83.7%)
	Combination (Smokeless + smoking)	7 (16.2%)
Site	Buccal mucosa only	26 (52%)
	RMT only	2 (4%)
	Buccal mucosa + RMT	22 (44%)
Size of the lesion	< 2 cm	28 (56%)
	2 – 4 cm	22 (44%)
	> 4 cm	None
Stage	I	16 (32%)
	II	14 (28%)
	III	19 (38%)
	IV	1 (2%)

Table 2 Postoperative Course And Follow Up

Results	Number of patients N = 50 (%)
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Healing	2 weeks	12 (24%)
	2-4 weeks	29 (58%)
	> 4 weeks	9 (18%) (1-orocutaneous fistula)
Adjuvant therapy	RT	27 (54%)
	RT + CT	2 (4%) (1- positive margin, 1-ECE)
	None	21 (42%)
Mouth opening (Trismus Grade)	>35 mm (No)	6 (12%)
	25-35 mm (Gr-1)	
	15-25 mm (Gr-2)	35 (70%)
	< 15 mm (Gr-3)	9 (18%)
		None

DISCUSSION

Tumours of the posterior part of the mouth and/or oropharynx are diagnosed at advanced stages due to minimal symptoms (Kostas Antoniadis et al., 2005). The importance of restoration of form and function cannot be underestimated due to associated vital functions such as speech and swallowing. The vast improvements in vascular microsurgery and use of free flaps have provided multiple options to the surgeon for oral cavity reconstruction. Prolonged surgery, donor and recipient site morbidity and need for surgical expertise are the limiting factors in the use of free flaps.

In such situations local masseter flap provides a reasonable reconstruction alternative for posterior buccal mucosa and retromolar trigone lesions.

Conley and Gullane introduced the masseter muscle flap as a reconstructive measure for the oropharynx in 1978 (Conley & Gullane, 1978). Masseter flap is a local pedicled flap which is technically easy, fast and provides adequate bulk for coverage of small posterior buccal mucosa and oropharyngeal defects. Tiwari and Snow (Tiwari & Snow, 1989) and Langdon (Langdon, 1989) demonstrated the usefulness of this flap highlighting the minimal time and technical support required. In the series by Langdon, there were no complications related to the flap and in all cases the bare muscle epithelialized spontaneously with no breakdown of the suture margins. No complications were reported either with previous or adjuvant radiotherapy.

In another study Antoniadis et al (K. Antoniadis et al., 2003) demonstrated masseter flap to be a reliable method for reconstruction in oncologically safe cases. The viability of the flap was excellent in all patients and epithelization was completed within 3 weeks. It provides sufficient bulk and harvested in a safe, single stage procedure and does not require elaborate technique and aftercare.

Mahieu et al (Mahieu et al., 2016) utilized the same in two previously pre-treated patients presenting with a second primary oral squamous cell carcinoma with excellent functional results and satisfactory cosmetic appearance. The advantage of the masseter flap lies in the simple technique, easy pliability for posterior defects, low post-operative complications and minimal donor site morbidity.

The major constraint in the use of the masseter flap is its close vicinity to the primary tumour. Infiltration of the muscle by the carcinoma prohibits its use for reconstruction. Clinically when the epicentre of the primary tumour is located medial to the retromolar trigone and the pterygomandibular ligament is intact, the use of the masseter muscle is safe (Lane et al., 2000). The main disadvantage is the postoperative restriction of mouth opening (Langdon, 1989), which is aggravated by intramuscular fibrosis, resulting from postoperative radiotherapy. In our study we found that 35 patients had mouth opening between 25-35 mm while 9 patients had mouth opening between 15-25 mm requiring the use of heisters jaw opener. In the series reported by Tiwari and Snow (Tiwari & Snow, 1989) the flap survived in 23 of 24 cases. In two cases, there was a temporary cutaneous fistula in the neck. Three patients had temporary trismus while one patient had persistent trismus.

In another study by Antoniadis et al (Kostas Antoniadis et al., 2005) patients made a satisfactory postoperative recovery, during which no complications were encountered, except for a restricted interincisal distance, always less than 31 mm, which was attributed to the contraction of the flap and to the postoperative radiation therapy.

However the masseter flap has been rarely used for oral cavity and oropharyngeal reconstructions, results of only 60 patients are available in literature till date. Our study provides clinical experience of fifty patients who underwent masseter flap reconstruction with satisfactory results forming the largest series till date. Our study shows that it is a safe one-stage procedure, which does not require elaborate techniques or postoperative care, and results in acceptable aesthetic and functional results.

CONCLUSIONS

Our study shows the use of a technically easy masseter flap with adequate functional outcomes in patients who are not prime candidates for free flaps following cancer resection at the retromolar trigone and posterior buccal mucosa lesions. Hence masseter flap should be kept in mind as it may provide a simple and effective solution in a difficult situation.

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