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## Original article

# Reliability of the pectoralis major myocutaneous flap in reconstructive oral cancer surgery in developing countries: Our experience



Atanu Bhanja <sup>a,\*</sup>, Col D.S.J. D'Souza (Retd)<sup>b</sup>, Collin Roy<sup>c</sup>, R.N. Poddar<sup>d</sup>

<sup>a</sup> Assistant Professor, Department of Dental Surgery, SMIMS, Gangtok, India

<sup>b</sup> Professor & Head, Department of Dental Surgery, SMIMS, Gangtok, India

<sup>c</sup> Professor & Head, Department of Plastic and Reconstructive Surgery, NRSMCH, Kolkata, India

<sup>d</sup> Professor, Department of Maxillofacial Surgery, R. Ahmed Dental College & Hospital, Kolkata, India

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## ABSTRACT

**Background:** Although free flaps are nowadays considered 'Gold standard' of head and neck reconstruction, pectoralis major myocutaneous (PMMC) flap is still popular among many reconstructive cancer surgeons in developing countries for its many advantages and also due to lack of resources for free flaps in most of the centers, large number of cancer patients with poor nutritional status and economic condition. However, many studies have reported high complication rate in PMMC flap. So, the purpose of our study was to evaluate the reliability of PMMC flap.

**Methods:** Within a span of 2 years, 20 reconstructions were done with PMMC flaps in patients with oral cancer and they were followed for a period of 1 year. Documentation was done for patient demographics, site of lesion, duration for reconstruction, occurrence of complications, etc.

**Result:** Among 17 males and 3 female patients, complications developed in 4 males and all female patients (total 7 patients, overall 35%). Flap-related complications were – one major (5%) and six minor (30%), which were comprised of three orocutaneous fistula (15%), three partial flap loss (15%), two marginal necrosis (10%), and one donor site necrosis (5%). Total necrosis was nil in our study. All the complications were managed conservatively except the patient with major complication which required intervention. Final cosmetic and functional outcome was acceptable in majority of patients.

**Conclusion:** PMMC flap is still 'workhorse' of reconstruction in head neck cancer patients in developing countries and can be used effectively with acceptable morbidity.

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\* Corresponding author. Tel.: +91 9434142646.

E-mail address: [doc.abhanja@gmail.com](mailto:doc.abhanja@gmail.com) (A. Bhanja).

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## Introduction

Oral cancer is a scourge that cuts across all the socio-economic strata of society affecting increasingly large numbers of patients worldwide. The widespread use of tobacco and associated products in the lowest socioeconomic groups, illiteracy, poverty, and consequential poor oral hygiene awareness contribute to high prevalence and late reporting of oro-pharyngeal cancer. Early detection and multidisciplinary therapy remains the most effective weapon against oral cancer. However, many patients report in advanced stages of the disease and one of the barriers to their optimum treatment remains economic factors. Surgery is still considered mainstay therapy along with or without adjuvant chemotherapy and/or radiotherapy.

Reconstruction of post-oncosurgical defects in the head and neck region presents a challenge due to the complex anatomy and functional demands of this region. Nowadays, microvascular free flaps are considered the gold standard for reconstruction, whereas pedicled flaps are commonly utilized as a salvage procedure.<sup>1</sup> The limitations, however, of microvascular reconstruction techniques lie in the fact that the expertise and facilities for this specialized surgery are not available at all centers; procedure is costly; and operating time is greatly increased which entails higher anesthetic risk for critically ill patients.<sup>2</sup>

In contrast, pectoralis major myocutaneous (PMMC) flap is still considered as the 'work horse of pedicled flaps' for head-neck reconstruction, since its description by Ariyan in 1979<sup>3</sup> and it still remains popular in developing countries around the globe.<sup>4</sup> The advantages of this flap are excellent vascularity, proximity to head and neck region, simplicity of harvesting, and consequent to their bulk have the main benefit of covering vital structures of neck, unlike free flaps or other regional flaps.<sup>5</sup>

Literature, however, has reported various complication following PMMC flap reconstruction such as partial necrosis, dehiscence, or fistula formation.<sup>6,7</sup> A study was undertaken, therefore, to evaluate the reliability of this flap, in the reconstruction of oral cancer patients and to evaluate the complications arising thereof.

## Materials and method

The study was conducted in the Department of Oral and Maxillofacial Surgery of a dental college following institutional ethical clearance.

Initially all patients with histopathologically confirmed oral carcinoma reporting to the Maxillofacial Surgery OPD were evaluated for suitability as per laid-down criteria. They were evaluated on the basis of history, clinical, radiological, histopathological findings, and routine blood examination prior to treatment planning. The staging was done according to TNM classification (UICC 2002 criteria).

The inclusion criteria were: patients diagnosed with resectable oral carcinoma confirmed histopathologically; willingness to be a part of the study; cases where post-excisional defect would need reconstruction with PMMC flap.

Patients who were not included in the study were those presenting with compromised medical condition; distant metastasis (confirmed with chest radiograph and abdominal ultrasound); and invasion to critical region such as skull base.

Among 32 initially shortlisted patients, 2 patients were excluded due to sudden deterioration in their medical condition and 3 patients presented with inoperable lesions with an h/o recurrence and were sent for palliative care with chemotherapy and radiotherapy. In some cases, surgical reconstruction was done exclusively by forehead flaps or deltopectoral flaps (7 patients) and hence they were excluded from the final study. After the exclusion of twelve patients, remaining 20 patients were finally included in our study. Informed written consent was taken prior to the study.

The same team of surgeons performed both ablative and reconstructive surgeries using standard operating procedures.

### Surgical technique

All the patients underwent wide (2 cm) excision of the lesion with segmental mandibulectomy (either due to close proximity to the mandible/lesion involving mandible) along with modified radical neck dissection/radical neck dissection (depending on N status) in continuity. Bony reconstruction was not undertaken for the continuity defect. Only PMMC flap was utilized for reconstruction of complex defect after ablative surgery.

### Surgical technique of PMMC flap reconstruction

#### Marking

The vascular axis of pectoral branch of thoracoacromial artery was drawn on the chest wall as a line that descends perpendicularly from the middle of the clavicle and then bends and follows an imaginary line from acromion toward xiphisternum (Fig. 1B). The size, shape, and location of the skin paddle were determined by the size, shape of the surgical defect, and its distance from the point of pivot (midclavicular point) of the flap. First, a piece of roller gauze was used to measure the distance from midclavicular point up to the most distal portion of the surgical defect (Fig. 1A), and then distal tip of the skin paddle was marked at the same distance from point of pivot along vascular axis. Finally, a skin island was drawn according to size and shape of the surgical defect.

#### Flap elevation

Initial incision was made from lateral edge of designed skin paddle toward the anterior axillary line. The superior skin flap incision was made only up to the muscle fibers of the pectoralis major muscle. The inferior, medial, and lateral incisions were made through the muscle and fascia of the pectoralis major muscle and down to the chest wall. The skin paddle was temporarily secured to the muscle with few sutures to decrease any shearing injury to the perforators. The PMMC muscle was divided medial and lateral to the vessels with either electrocautery or scissors all the way up to the clavicle avoiding injury to the vessel which was identified by visualization and palpation on the deep surface of the muscle at about mid clavicular point. Division of muscle medially and laterally permitted further elevation and greater arc of

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