

## Defect-oriented reconstruction for advanced Head and Neck malignancy using Pectoralis Major Myocutaneous flap variations- Our experience in 7 case scenarios

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### Abstract

**Introduction:** Head and neck cancers (HNCs) are the most common cancers in the world with India leading in the number of cases. Considering the vast majority of morbidity and mortality associated with HNC, proper planning & execution is needed to achieve best cosmetic & functional outcome. The reconstruction of such large complex defects which has extensive loss of mucosa, bone, soft tissue & skin is a challenge. **Aims and objectives:** To highlight the utility of different ways of Pectoralis Major Myocutaneous Flap [PMMC] reconstruction in advanced head and neck cancer at a single rural cancer hospital in western India. **Material and methods:** In seven patients, Pectoralis major myocutaneous flap (PMMC) was used for reconstruction for various defects. Complications were noted post operatively. **Results:** Single paddle PMMC flap, Spiral PMMC flap was used in 2 patients each, Bipaddle PMMC flap, Tube PMMC flap and contralateral PMMC flap was used in 1 patient each. No major complications were found post-operatively. Amongst minor complications, one patient had seroma formation beneath the flap, one had suture dehiscence and one patient had peripheral partial necrosis and all were managed conservatively with good results. **Conclusion:** The pectoralis major flap is a reliable option for primary and secondary soft tissue reconstruction in the head and neck surgeries. Due to abundant vasculature, less donor and recipient mortality and morbidity, PMMC continues to be the safe option for surgical reconstruction in head and neck cancer patients.

**Keywords:** Head and neck cancers, Pectoralis major myocutaneous flap, Reconstruction, Vasculature.

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### Introduction

The purpose of this study is to share our experience using the pectoralis major myocutaneous flap for one-stage reconstruction in different head and neck cancer defects. The first published reports of the use of a pectoralis major myocutaneous flap (PMMC) in head and neck reconstruction was that of Ariyan[1,2]. Freeman et al. described the vascular anatomy of PMMC[3]. Although free-tissue transfer has emerged as a safe, reliable means of soft tissue and bony reconstruction in the head and neck, PMMC should still be considered as a valid option for different defect-oriented reconstructions.

### Material and Methodology

We identified 7 patients in whom we had used PMMC flap for reconstruction at different defects. Patients' age ranged between 30 and 70 years & ECOG 1. After proper clinical and radiological evaluation for resectability, surgery for a loco regional disease was undertaken, and the defect reconstruction was done using PMMC flap. The standard surgical technique was used to harvest PMMC flap. Baseline data of study participants i.e. age; sex; clinical presentation, diagnosis, previous surgery, size of defect, anatomic boundaries of defect, tumor node metastasis, staging, operative procedure and postoperative complication rates.

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Etc. was recorded in the pre-structured questionnaire. Utility of PMCC flap was observed by complication and flap uptake. Patients' were followed up in postoperative period to see the short-term complications in the flap (till discharge or first follow-up). Complications related to the flap were categorized into major and minor complications. Major complications were those that needed reoperation, or that resulted in failure of the reconstruction objective thereby needing another flap. Minor complications were considered those that were treated in a conservative manner. Conservative treatment comprised dressings, debridement, and the use of medication. Partial or total loss of the flap was analysed separately.

### Results

Among the 7 patients included in the study, 6 were male and 1 female. The age of the patients was ranged from 30 to 65 years. All patients were ECOG 1 and they all had Primary tumor T4 staging & none of them had nodal involvement (N0) & metastasis (M0). The malignancies were located in oral cavity in 4 patients [among which 3 cases were in the bucco-alveolar complex & 1 in the tongue/ floor of the mouth], 01 of them was located in the laryngo-pharyngeal area, and 01 patient had salivary gland tumour and nodal disease with skin involvement 01 patient. Out of 7 patients, we used single paddle PMMC in 2 patients for their mucosal lining defect& floor of mouth defect. Bipaddle PMMC flap was used in 1 patient for their mucosal and skin defects. Spiral PMMC flap was used in 02 patients to cover the skin defect alone. Tube PMMC flap was used in 01 patient to reconstruct the neopharynx. Contralateral PMMC was used in 1 patient for reconstruction in recurrence case where ipsilateral PMMC was already used. [table 1]

In postoperative period, no patients had any major complications, one patient had seroma formation beneath the flap, one had suture dehiscence and one patient had peripheral partial necrosis and all were

managed conservatively with good results. The total necrosis was not found in any patient.[chart 1]

Out of the 7 patients, flap was accepted in all (100%) patients.

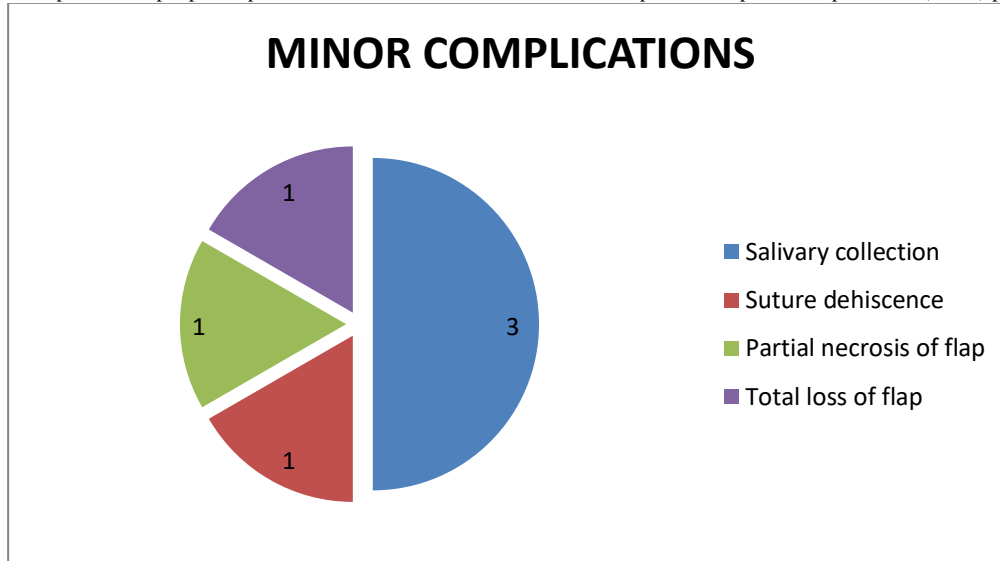


Fig. 1: Observed Complications

Table 1: Distribution of cases according to Site of malignancy and types of PMMC flaps

PMMC	Site of malignancy	Count of Sr. No.
<b>Bipedal</b>	Buccoalveolar Complex	<b>1</b>
<b>Single Paddle</b>	Buccoalveolar Complex	1
	Tongue + Floor of Mouth	1
<b>Spiral</b>	Neck Skin	<b>1</b>
	Parotid	1
<b>Tube</b>	Laryngopharynx	<b>1</b>
<b>Contralateral</b>	Buccoalveolar Complex	1
<b>Grand Total</b>		<b>7</b>



Fig. 2: Single paddle PMMC



Fig. 3: Bipaddle PMMC



Fig. 4: Spiral PMMC

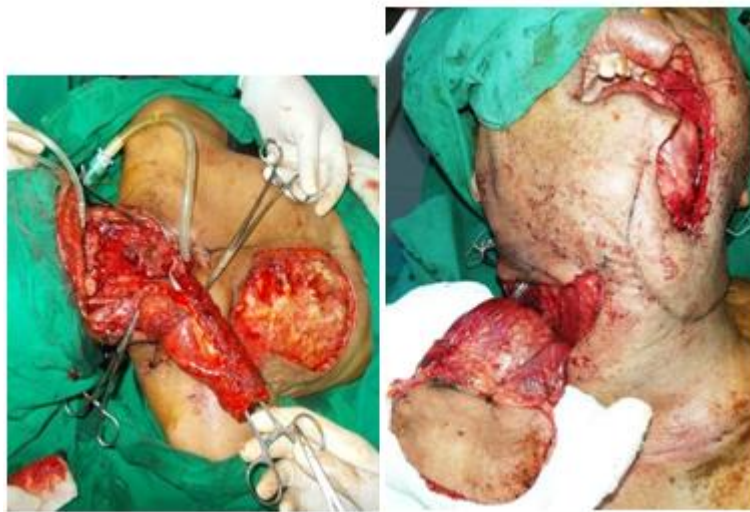


Fig. 5: Tube PMMC (left side) and Contralateral PMMC(right side)

### Discussion

Head and neck cancers (HNCs) are the most common cancers in the world with India bearing the most brunt of it.

The principle for surgical treatment of head and neck cancer include adequate resection margin with functionally and aesthetically good reconstruction however in the fright of reconstruction; margins should not be compromised[4].

It is currently broadly accepted that the versatile free flaps with microsurgical vascular anastomosis are the preferred methods for major defect reconstruction in patients who undergo head and neck cancer surgery[5-7]. However, free flaps demand specialized surgical skills, special and costly instrumentation, and rigorous postoperative monitoring[8,9]. Due to restraint of such factors in many head and neck centres, especially in developing countries other feasible methods have to be used.

Easy reach of the flap up to mandible and cheek, good vascularity based on perforators, technical simplicity, and coverage of the exposed vessels by muscle after neck dissection and the ability to provide bulk in the neck made it a popular option amongst onco-reconstructive surgeons.

With this background the present study was undertaken to analyse the utility of PMMC flap in different Head & Neck Cancer defects at a single rural cancer hospital in western India.

The study had mean age of 48years.The average ECOG grade was 1 & all patients were in T4 stage of malignancy. The staging was done according to AJCC 8<sup>th</sup> edition.

A good success rate of 100% for the flap uptake was seen in the present study which is in accordance with the many studies in the

literature. Pradhan P et al[10] and Ethier et al[11] 2018 reported 100% & 89% success rates respectively in their studies. In our study, no patients had any major complications. Few minor complications such as seroma, suture dehiscence and partial flap necrosis were seen but effectively managed conservatively with good results.

Overall low rate of complications was observed compared to Shah et al (1990) 63%, Kroll et al (1990) 63%, Ljsselstein et al. (1996) 53%[12-14]. These lower incidences could be attributed to the modified PMMC flap harvesting technique.

The present study is one of the rare studies highlighting the different defect-based reconstruction using PMMC flap. We used single paddle PMMC to reconstruct the defects caused by malignancy at bucco-alveolar complex & tongue/floor of mouth. [Photo 1] Owing to the bulk, design & method of harvesting, Bipaddle PMMC was even used to reconstruct the angle of mouth [when required].[Photo 2] SPIRAL PMMC is also a good flap to reconstruct skin defects with parotid malignancy, neck skin defects, etc. owing to its reach & stability.[photo 3] Tube PMMC as the name suggests was used for neopharynx reconstruction.[photo 4]Cross[contralateral] PMMC was used as reconstruction method in case of recurrence where ipsilateral loss of PMMC was already used.

Patch PMMC can also be used for neopharynx reconstruction however it was not performed in the present study.

PMMC flap offers one stage reconstruction, no need to change patient's position, the cutaneous island is large enough to cover practically any defect and it can be used for defects of two epithelial surfaces. The flap with its tissue bulk corrects the neck and face

contour and muscular part protects the major vessels of neck, especially in previously irradiated patients.

Despite paucity of literature, the option of contralateral PMMC flap can be considered effective to meet our surgical need regarding reconstruction after salvage surgical treatment or failed reconstruction after ipsilateral PMMC flap is used.

Avoiding prolongation of treatment as an additional advantage in contrast to deltopectoral fasciocutaneous or forehead fasciocutaneous flap which requires second stage detachment and resuturing after about 3 weeks and final suture removal after that effectively delaying adjuvant treatment.

Also there are few distinct advantage of P.M.M.C flaps over the widely accepted gastric pull up in laryngopharyngeal reconstruction like the flap can be tailored to suit the defect, obviating the need for extensive removal of normal oesophagus, Storage function of stomach is maintained, less chance of fistula compared to a primary closure in post irradiated laryngopharynx, the muscle pedicle of the flap protects the carotid against blow outs when a neck dissection has been done on the same side, compared to a jejunal, ileal or colonic interpositional graft (both pedicled or vascularised) P.M.M.C. is less cumbersome and doesn't require the expertise of micro vascular anastomosis[15]. However, follow-up in the neck area is more complicated because the flap can hide neck recurrences. In women there is breast asymmetry and often the flap might include also breast tissue. In males hairy chest skin is placed intra-orally.

#### Conclusion

The pectoralis major flap can be a reliable option for primary and secondary soft tissue reconstruction in the head and neck especially where bulk is needed. Due to the presence of a definite vascular pedicle, ease of harvesting the flap, low donor site morbidity & minimal postoperative morbidities, it continues to be one of the most universal flaps in head and neck reconstruction especially at rural cancer hospital with constraint resources.

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