Section: General Surgery

Original Research Article

BEYOND TRADITIONAL SKIN PADDLES OUTCOMES OF INFRAMAMMARY PMMC FLAP IN ORAL CANCER RECONSTRUCTION: A PROSPECTIVE OBSERVATIONAL STUDY

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ABSTRACT

Background: Reconstruction following resection of oral cavity cancers remains a cornerstone in achieving optimal functional and aesthetic outcomes. Despite the evolution of microvascular free flaps, the Pectoralis Major Myocutaneous (PMMC) flap continues to be a reliable and widely used option, particularly in resource-limited settings. This study presents our institutional experience with PMMC flap reconstruction in oral cavity cancer patients, focusing on indications, techniques, outcomes, and complications. **Materials and Methods:** We conducted a study on 8 patients who underwent PMMC flap reconstruction following ablative surgery for oral cavity malignancies in our Department of Surgical oncology, Dsmch Data were collected on demographic profiles, tumor characteristics, surgical details, flap viability, complications, hospital stay, and postoperative functional outcomes. **Result:** Of the 8 patients, five cases were in the primary setting and three were salvage. Tumor sites included alveolus (2), buccal mucosa (2), tongue and floor of mouth (2), mandible (1), and submandibular gland (1). PMMC flaps were harvested in all patients; 4 were designed in bipaddled fashion, skin cover requirements in 5 cases. The average flap harvest time was 40 minutes, Flap success rate-100%. **Conclusion:** PMMC flap remains a versatile and dependable option for head and neck reconstruction, particularly in scenarios where microvascular expertise or facilities are limited. Our technique is feasible reaffirms its role as a workhorse flap, offering acceptable outcomes with a manageable complication profile.

INTRODUCTION

Oral cavity cancer is one of the most common malignancies in India, accounting for a significant proportion of head and neck cancers. Its high prevalence is largely attributed to tobacco consumption in various forms, alcohol use, poor oral hygiene, and HPV infection. The most frequently affected sites include the tongue, buccal mucosa, gingivobuccal sulcus, and floor of the mouth.[1-3]

Surgical excision remains the cornerstone of treatment for operable oral cancers, often accompanied by neck dissection for regional lymphatic control. However, extensive resections result in complex soft tissue and mucosal defects that necessitate prompt and effective reconstruction to restore function, speech, swallowing, and cosmesis.[4]

The Pectoralis Major Myocutaneous (PMMC) flap, first described by Ariyan in 1979, remains a workhorse flap for head and neck reconstruction in many centers, especially in resource-limited settings. It is a pedicled flap based on the thoracoacromial artery, offering robust vascularity, reliable skin coverage, and adequate muscle bulk.[5-7]

Despite the evolution of microvascular free flaps, the PMMC flap continues to be widely used in India due to its ease of harvest, reduced operative time, no need for microvascular expertise, and excellent versatility.

Parameter	Global	India
Annual Incidence	~378,000	~136,000
Annual Mortality	~178,000	~75,000
5-Year Survival Rate	30–80% (stage-dependent)	Lower (due to late detection)
Common Risk Factors	Tobacco, alcohol, HPV	Tobacco (esp. smokeless), alcohol
Common Reconstruction Methods	Free flaps, local flaps	PMMC, RFFF, FFF.

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Review of Literature

The pectoralis major myocutaneous flap, originally introduced by Ariyan, continues to be a reliable reconstructive option in head and neck surgery, particularly in environments where microvascular free flap facilities are limited. Its consistent vascular supply from the thoracoacromial axis, ease of harvest, and reduced operative duration contribute to its ongoing clinical relevance. In addition to its primary role, it is frequently utilized as a salvage procedure following failure of free tissue transfer.

Several modifications have been described to optimize flap performance and minimize complications such as distal necrosis, excessive bulk, and donor site deformity. Among these, the inframammary (submammary) approach has emerged as a useful refinement. Positioning the incision along the inframammary fold allows better concealment of scars and helps preserve breast contour, making it particularly advantageous in female patients.

Current evidence indicates that this technique does not compromise flap viability while offering improved aesthetic outcomes and reduced donor site morbidity. Complications such as partial flap loss and fistula formation may still occur but are comparable to those seen with conventional methods. Overall, this modification enhances cosmetic results while retaining the established reliability of the PMMC flap.

MATERIALS AND METHODS

The study was approved by ethical committee of the institute. A total of 8 patients who underwent excision of oral cavity cancer and reconstruction of the resultant defect with Pectoralis major myocutaneous flap from March 2025 to February 2026 at our institute were included in the study.

S.no	Age	Gender	Site	Type of flap	Involvement of skin
1	51	Female	Fibular flap failure	Bipaddled	+
2	57	Female	Submandibular glandular carcinoma	Unipaddled	+
3	68	Female	Right BM/Post CTRT residue with OCF	Bipaddled	-
4	48	Male	Ca FoM with hand erosion	Unipaddled	+
5	52	Male	Ca Lower alveolus	Unipaddled	+
6	47	Female	Ca Chin with OCF	Bipaddled	+
7	54	Male	CuP Neck/Post CTRT residue	Unipaddled	-
8	56	Male	Ca Alveolus with Mandibular Invasion	Bipaddled	-

BM →Buccal Mucosa, CTRT→ Chemo Radio Therapy, OCF → Orocutaneous Fistula, FoM → Floor of Mouth
CuP Neck → Carcinoma of Unknown Primary presenting as Neck node metastasis

Patient Selection

- Any scar over the chest wall which might interfere with the design of the flap should be noted
- The presence of the pectoralis major muscle should be checked by asking the patient to tighten the muscle by adduction of the arm.
- Poland syndrome should be ruled out
- Cardiac or pulmonary diseases, these should be optimized preoperatively. After harvesting the pectoralis major flap, the chest wound is significant there is a decrease in forced vital capacity in patients after pectoralis major flap harvest.

Operative Technique: The skin paddle is designed along the inframammary fold by elevating the breast with the contralateral hand to achieve appropriate positioning.

A guiding line is then marked extending from the lower border of the planned skin paddle to the anterior axillary fold. An incision is made along this line and deepened carefully until the pectoralis major muscle and its inferior margin are identified. If required, the skin paddle is modified to ensure it lies directly over the muscle.

In our approach, an additional margin of approximately 1–2 cm of surrounding subcutaneous fatty tissue is included beyond the skin paddle boundaries to enhance flap vascularity and viability.

With the skin paddle maintained over the pectoralis major muscle, the superior skin flap along with the breast tissue is elevated up to the level of the clavicle. To minimize shear forces and maintain adherence, interrupted sutures are placed between the dermis of the skin paddle and the underlying muscle.

The lateral and inferior borders of the pectoralis major muscle are then identified, and the muscle is elevated off the chest wall and the underlying pectoralis minor muscle, progressing superiorly toward the clavicle. During this dissection, the vascular pedicle can be visualized on the deep surface of the muscle. The lateral and medial pectoral nerves are divided intentionally to facilitate subsequent muscle atrophy and reduce flap bulk.

The pectoralis major myocutaneous flap is then tunneled into the neck, positioned within the defect, and secured with sutures after confirming that there is no undue tension.

Finally, the donor site is closed primarily.

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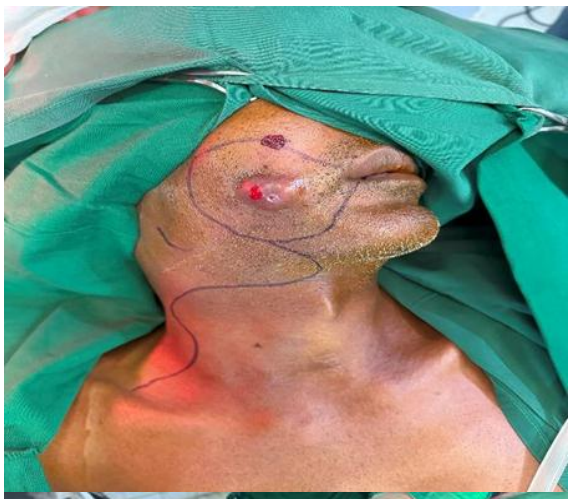

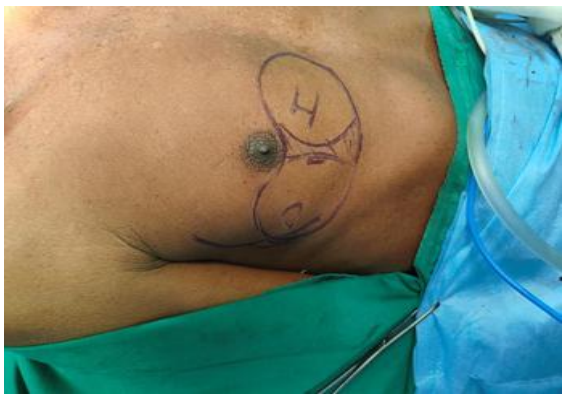

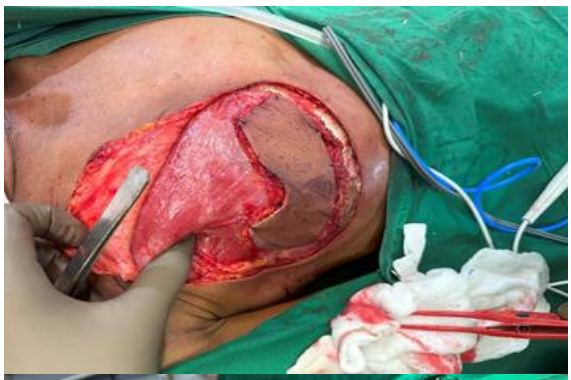

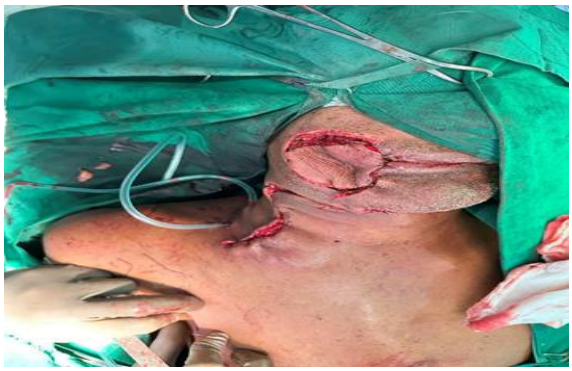

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ON REVIEW -POD 10

RESULTS

Buccal mucosa was the most common site of primary malignancy in the patients included in the study.
The maximum number of patients belong to 40–60 years of age group.

NUMBER	8
AGE GROUP	40 -50 yrs =3, 50-60 yrs =4, >60 yrs=1
GENDER	Male =4, Female = 4
Types of malignancies and flaps included in this study	Primary-5,Salvage-3 Oral cavity malignancies = 5 Salivary gland carcinoma = 1 CuP Neck= 1 Fibular flap= 1
Harvest Time	40mins
Flap Success rate	100%

Complications following PMMC flap harvest
Complications based on other studies

Complication	**Percentage**
Total flap necrosis	16%
Major partial flap necrosis	37.5%
Minor partial flap necrosis	62.5%
Fistula	12%
Wound dehiscence	26%
Hematoma	7%
Infection (superficial and deep)	11%

Complications in my study

Complication	**Percentage**
Total flap necrosis	NIL
Major partial flap necrosis	NIL
Minor partial flap necrosis	NIL
Fistula	NIL
Wound dehiscence	NIL
Hematoma	NIL
Infection	12.5%

• Complications Number
Flap Infection 1
One patient developed a local flap site infection post-operatively which was managed conservatively with culture specific antibiotics.

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DISCUSSION

PMMC flap continues to play a critical role, especially in:

- Centers lacking microvascular expertise.
- Salvage situations, such as after previous surgery or radiotherapy, where recipient vessels may be compromised.
- Medically unfit patients who may not tolerate prolonged free flap procedures.
- Urgent or palliative reconstructions where time is of the essence.
- It is also used as a salvage in case of free flap failure and in patients who are unfit to undergo prolonged surgery

Moreover, PMMC flaps have demonstrated acceptable functional outcomes in terms of speech and swallowing, low rates of major complications, and can be used effectively in both primary reconstructions and salvage surgeries.[8-15]

Study	Sample Size	Total Flap Failure	Overall Complication Rate	Key Findings
Gupta et al. (2015)	126	0%	48.38%	High complication rate despite no total flap failures.
Chakrabarti et al.	496	2.4%	Not specified	Notable rates of partial skin loss and other complications.
Mehta et al. (1996)	47	2.1%	Not specified	Identified higher failure risk in females and certain clinical conditions.
Jena et al.	140 (females)	1.4%	21.4%	Increased complications in females with conventional harvesting.

CONCLUSION

Reconstruction of oral cavity defects following oncologic resection requires restoration of both form and function while minimizing donor site morbidity. The pectoralis major myocutaneous (PMMC) flap continues to be a dependable reconstructive option, particularly in resource-limited settings where microvascular facilities may not be readily available. In our experience, the use of a submammary (inframammary) approach for PMMC flap harvest has demonstrated favorable outcomes. This technique allows for better aesthetic placement of the donor site scar, improved flap reach, and preservation of surrounding tissues. Importantly, it is associated with a lower incidence of postoperative complications, including flap necrosis, wound dehiscence, and orocutaneous fistula formation, while ensuring reliable vascularity and flap survival at the recipient site.

Furthermore, donor site morbidity was minimal, with reduced chest wall deformity and improved patient satisfaction. The modification in flap harvest technique contributes to enhanced surgical ergonomics and may shorten operative time.

Overall, our findings reinforce that the PMMC flap remains a practical, safe, and effective reconstructive option, and that the inframammary approach offers a distinct advantage in reducing complications and improving both functional and aesthetic outcomes. This technique is especially valuable in high-volume centers and developing regions where simplicity, reliability, and reproducibility are essential.

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