EUROPEAN JOURNAL OF BIOMEDICAL AND PHARMACEUTICAL SCIENCES
http://www.ejbps.com

ISSN 2349-8870
Coden USA: EJBPBO
Volume: 13
Issue: 7
Year: 2026

EARLY FUNCTIONAL AND POSTOPERATIVE OUTCOMES FOLLOWING LOCOREGIONAL RECONSTRUCTION AFTER HEAD AND NECK CANCER RESECTION: A RETROSPECTIVE TERTIARY CARE STUDY

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DOI: https://doi.org/10.5281/zenodo.21290568

How to cite this Article: Bhavya Wadhwani[1]*, Suman Kharkwal[2], Pranav M. Singhal[3], Archana Yadav[4] (2026). Early Functional And Postoperative Outcomes Following Locoregional Reconstruction After Head And Neck Cancer Resection: A Retrospective Tertiary Care Study. European Journal of Biomedical and Pharmaceutical Sciences, 13(7), 356–362.

Article Received on 13/06/2026 **Article Revised on 03/07/2026** **Article Published on 10/07/2026**

ABSTRACT

Background: Head and neck cancer resection frequently results in complex functional and aesthetic defects requiring reconstruction. In resource-constrained settings, locoregional reconstructive options continue to play an important role in selected patients. **Objective:** To evaluate postoperative complications and early functional outcomes following reconstruction after head and neck cancer resection in a tertiary care centre. **Materials and Methods:** This retrospective observational study included 93 consecutive patients with histologically confirmed head and neck carcinoma who underwent surgical resection followed by reconstruction between January 2021 and December 2022 at a tertiary care centre in New Delhi, India. Demographic details, tumor characteristics, reconstructive procedures, postoperative complications graded according to the Clavien–Dindo classification, flap viability, and functional outcomes assessed using the Performance Status Scale for Head and Neck Cancer (PSS-HN) at 6 months were analyzed. **Results:** The mean age of the study population was 52.3 ± 11.9 years, and tobacco use was present in 84.9% of patients. Buccal mucosa (44.1%) and tongue (27.9%) were the commonest tumor subsites. Reconstruction methods included primary closure (30.1%), pectoralis major myocutaneous flap (28.0%), nasolabial flap (14.0%), others (15.1%) and split-thickness skin graft reconstruction (12.9%). Grade I complications occurred in 82 patients (88.1%), Grade II complications in 9 patients (9.7%), and Grade III complications in 2 patients (2.2%). No Grade IV or Grade V c omplications were observed. Total flap necrosis occurred in 2 patients, resulting in an overall flap survival rate of 96.2%. Mean duration of nasogastric tube feeding was 21 days. At 6 months, the majority of patients demonstrated satisfactory oral intake and understandable speech. **Conclusion:** Reconstruction following head and neck cancer resection using locoregional techniques remains a reliable option in appropriately selected patients. Acceptable complication rates, high flap survival, and satisfactory early functional outcomes were observed in this tertiary care cohort.

KEYWORDS: Head and neck carcinoma; reconstruction; PMMC flap; nasolabial flap; postoperative complications; functional outcome.

INTRODUCTION

Head and neck carcinoma represents a major oncologic burden in developing countries, particularly in the Indian subcontinent where tobacco-related malignancies are highly prevalent. Surgical resection remains the cornerstone of treatment for resectable disease; however, ablative procedures frequently result in defects affecting speech, swallowing, mastication, and facial aesthetics.

Reconstruction following tumor resection aims to restore function while maintaining oncologic safety. Although microvascular free tissue transfer has become the standard reconstructive approach for large and complex defects, locoregional reconstructive techniques continue to remain clinically relevant in selected patients, especially in elderly individuals, patients with significant

comorbidities, and resource-constrained healthcare settings.

Commonly utilized locoregional reconstructive options in oral cavity defects include pectoralis major myocutaneous (PMMC) flap, nasolabial flap, others flap, and local advancement techniques. These procedures are technically less demanding, require shorter operative time, and remain dependable reconstructive alternatives in appropriately selected cases.

The present study aimed to evaluate postoperative complications, flap viability, and early functional outcomes following reconstruction after head and neck cancer resection in a tertiary care centre.

MATERIALS AND METHODS

Study Design and Setting

A retrospective observational study was conducted at the Department of Surgical Oncology, ESIC Medical College and Hospital, New Delhi, India, between January 2021 and December 2022.

Institutional Ethics Committee approval was obtained prior to data collection (IEC/2025075). Owing to the retrospective nature of the study, waiver of informed consent for data analysis was granted by the Ethics Committee.

Study Population

Ninety-three consecutive patients with histologically confirmed head and neck carcinoma who underwent surgical resection followed by reconstruction were included.

Inclusion Criteria

- Age ≥18 years
- ECOG Performance Status 0–1
- Resectable head and neck carcinoma
- Reconstruction performed following tumor resection

Exclusion Criteria

- Unresectable disease
- Distant metastasis
- ECOG Performance Status ≥2
- Previous surgery or radiotherapy significantly limiting reconstructive options

Preoperative Evaluation

All patients underwent detailed clinical examination and radiological evaluation using contrast-enhanced computed tomography or magnetic resonance imaging. Tumors were staged according to the American Joint Committee on Cancer (AJCC) 8th edition staging system.

Reconstruction Techniques

Reconstruction techniques utilized included:

1. Primary closure
2. Pectoralis major myocutaneous (PMMC) flap
3. Nasolabial flap
4. Split-thickness skin graft reconstruction
5. others

Choice of reconstruction was individualized according to defect size, subsite, extent of resection, and patient-related factors.

Outcome Measures

Primary Outcome

Postoperative complications were graded according to the Clavien–Dindo classification.

- Grade I: Minor complications not requiring pharmacological or surgical intervention
- Grade II: Complications requiring pharmacological treatment
- Grade III: Complications requiring surgical intervention
- Grade IV: Life-threatening complications requiring intensive care management
- Grade V: Mortality

Secondary Outcomes

- Flap viability
- Donor-site morbidity
- Duration of nasogastric tube feeding
- Functional outcome at 6 months using Performance Status Scale for Head and Neck Cancer (PSS-HN)

Statistical Analysis

Data were analyzed using SPSS version 25.0 (IBM Corp., Armonk, NY, USA). Continuous variables were expressed as mean ± standard deviation, while categorical variables were presented as frequencies and percentages. Comparative analysis between flap-based reconstruction groups was performed using Chi-square test or Fisher's exact test where appropriate. A p-value <0.05 was considered statistically significant.

RESULTS

Demographic and Clinical Characteristics

A total of 93 patients underwent reconstruction following surgical resection of head and neck malignancies during the study period. The mean age of the cohort was 52.3 ± 11.9 years. Tobacco use was documented in 79 patients (84.9%).

Buccal mucosa was the most common tumor subsite, followed by tongue and lip lesions.

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Table 1: Demographic and Tumor Characteristics.

Variable	Number of Patients (n)	Percentage (%)
Tobacco use	79	84.9
Buccal mucosa	41	44.1
Tongue	26	27.9
Lip	12	12.9
Alveolus	11	11.8
Floor of mouth	2	2.2
Mandible	1	1.0

The majority of patients presented with locally advanced disease.

Table 2: Clinical Staging.

Parameter	Category	Number of Patients (n)	Percentage (%)
T stage	cT1	12	12.9
	cT2	31	33.3
	cT3	39	41.9
	cT4	11	11.8
Nodal status	cN0	52	55.9
	cN+	41	44.1

Reconstruction Profile

Primary closure and PMMC flap reconstruction were the most commonly utilized techniques.

Table 3: Reconstruction Techniques.

Reconstruction Technique	Number of Patients (n)	Percentage (%)
Primary closure	28	30.1
PMMC flap	26	28.0
others	14	15.1
Nasolabial flap	13	14.0
Split-thickness skin graft	12	12.9

Postoperative Complications

Complications were graded according to the Clavien–Dindo classification.

Grade I complications constituted the majority and included minor wound erythema, seroma formation, delayed wound healing, and transient donor-site morbidity not requiring escalation of treatment. Grade II complications required pharmacological management, while Grade III complications required surgical intervention.

Table 4: Postoperative Complications.

Clavien–Dindo Grade	Number of Patients (n)	Percentage (%)
Grade I	82	88.1
Grade II	9	9.7
Grade III	2	2.2
Grade IV	0	0
Grade V	0	0

The overall major complication rate was 2.2%. Among 53 patients undergoing flap-based reconstruction, total flap necrosis occurred in 2 patients, resulting in an overall flap survival rate of 96.2%.

Table 5: Comparison of Flap -Related Complications Among Major Flap-Based Reconstruction Techniques.

Reconstruction Technique	Minor Complications n (%)	Major Complications n (%)	Flap Necrosis n (%)
PMMC flap (n=26)	8 (30.8)	1 (3.8)	1 (3.8)
Nasolabial flap (n=13)	3 (23.1)	0	0
other flap (n=14)	2 (14.3)	1 (7.1)	1 (7.1)

No statistically significant difference in overall complication rates was observed among the flap-based reconstruction groups ($p > 0.05$).

Functional Outcomes

Functional assessment at 6 months was available for all patients. Functional outcomes were categorized qualitatively based on postoperative clinical assessment using PSS-HN domains including oral intake, public eating, and speech intelligibility.

Table 6: Functional Outcomes at 6 Months.

Functional Parameter	Satisfactory Outcome n (%)
Adequate oral intake	81 (87.1%)
Ability to eat in public	76 (81.7%)
Understandable speech	84 (90.3%)

Mean duration of nasogastric tube feeding was 21 days (range: 14–25 days).

DISCUSSION

Reconstruction following head and neck cancer resection remains a challenging aspect of oncologic surgery because of the functional and aesthetic implications associated with oral cavity defects. Although microvascular free flap reconstruction is widely regarded as the standard approach for extensive defects, locoregional reconstructive techniques continue to retain an important role in selected clinical settings.

In the present study, PMMC flap was among the most commonly utilized reconstructive procedures and demonstrated acceptable postoperative outcomes. PMMC flap continues to remain a dependable reconstructive option because of its robust vascularity, technical reliability, shorter operative duration, and applicability in resource-limited settings.

Figure 1: **Intraoperative elevation of pectoralis major myocutaneous (PMMC) flap based on thoracoacromial pedicle.**

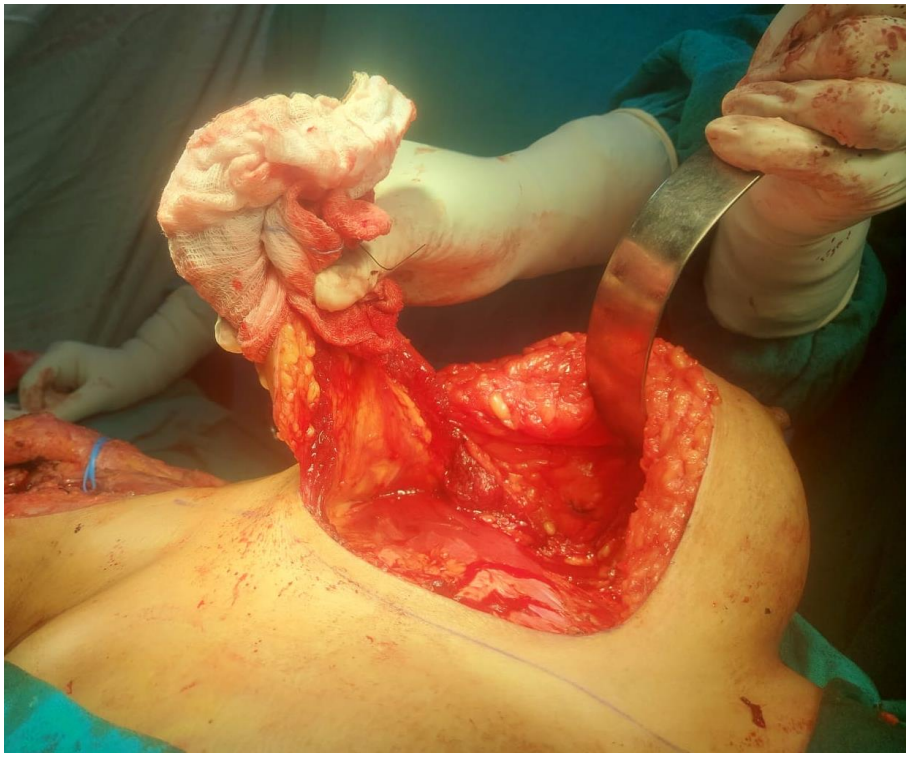

Figure 2: **PMMC flap harvested post breast elevation in female patient.**

Nasolabial and others flaps also demonstrated satisfactory reconstructive outcomes in selected patients with smaller oral cavity defects. These techniques offer favorable tissue match and acceptable functional restoration while avoiding the need for prolonged operative procedures.

Figure 3: **Marking and elevation of nasolabial flap.**

Figure 4: Pedicled nasolabial flap transposed toward intraoral defect.

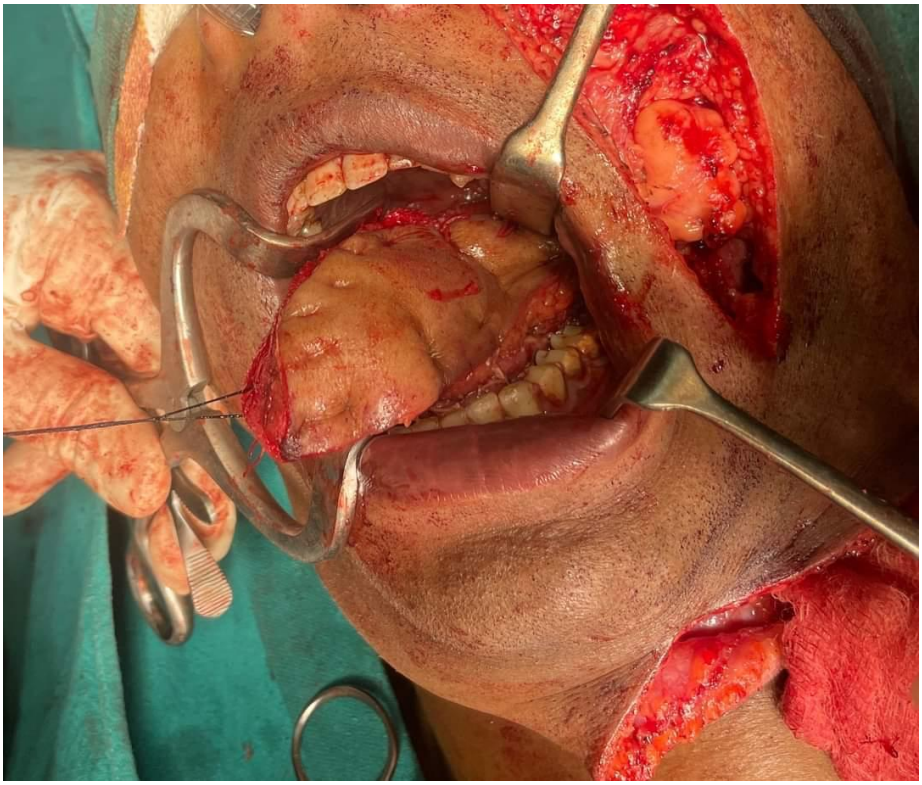

Figure 5: Inset of nasolabial flap into oral cavity defect.

The majority of patients in our cohort presented with advanced-stage disease, reflecting the typical presentation pattern encountered in high-volume tertiary oncology centres in India. Despite advanced tumor

burden, the overall flap survival rate remained high, and severe complications were infrequent.

The overall flap survival rate observed in the present study was comparable to previously published series reporting flap survival rates ranging between 94% and 98%. Minor wound-related complications constituted the majority of adverse events and were successfully managed conservatively.

Functional outcomes at 6 months demonstrated satisfactory oral intake and understandable speech in most patients.Satisfactory outcome was defined as preserved oral intake without long-term enteral feeding dependence and intelligible speech during routine conversation. Although preoperative baseline PSS-HN scores were not available for comparison, the findings suggest acceptable short-term postoperative recovery following reconstruction.

The present study has several limitations. The retrospective single-centre design limits generalizability. The study lacked a comparator free-flap cohort and long-term oncologic follow-up. In addition, detailed quantitative quality-of-life assessment and long-term functional evaluation were not available for all patients. Nevertheless, the study reflects routine reconstructive practice in a tertiary oncology centre and demonstrates that locoregional reconstructive techniques continue to provide acceptable outcomes in selected patients.

CONCLUSION

Reconstruction following head and neck cancer resection using locoregional and conventional reconstructive techniques remains safe and effective in selected patients. In the present tertiary care cohort, flap survival rates were high and major complications were uncommon. Acceptable early functional outcomes with satisfactory speech and oral intake were achieved in the majority of patients.

Further prospective studies with larger cohorts, comparative free-flap analysis, and longer follow-up are required to better define the long-term role of different reconstructive strategies in head and neck oncology.

Conflict of Interest

The authors declare no conflict of interest.

Ethical Approval

Institutional Ethics Committee approval was obtained prior to commencement of the study (IEC/2025075).

Informed Consent

Waiver of informed consent for retrospective data analysis was granted by the Institutional Ethics Committee.

Author Contributions

All authors contributed substantially to study conception, data collection, analysis, manuscript preparation, and final approval of the manuscript.

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