



COMPARATIVE STUDY OF FUNCTIONAL OUTCOME OF REGIONAL FLAP AND MICROVASCULAR FREE FLAP IN ORAL MALIGNANCY

Plastic Surgery

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ABSTRACT

Introduction-Free flaps have been the preferred method for reconstruction after resection of oral cavity cancer. However, pedicled flaps remain valuable alternatives in appropriate settings. **Objective**-To assess the comparative study of functional outcomes in terms of microvascular free flap and regional flap reconstruction in oral malignancy and to assess donor site morbidity. **Methods** -A total of 100 patients were included in this prospective study. 66 underwent reconstruction with pectoralis major flap and in 34 patients, a radial forearm or anterolateral thigh free flap had been used. In the group 34 patients who had received microvascular free flaps, 88.2% were male (30 patients), while 11.76% were female (4 patients). In contrast, the regional flap group of 66 patients had a higher percentage of males at 67.4% (62 patients) and only 6.06% females (4 patients). Overall, 92.0% of the total patient population were male (92 patients), and 8.0% were female (8 patients). A comparative analysis of functional outcome was carried out between the two groups. **Results**-less donor side deformity, good activity, better tongue movement, employment, swallowing, occlusion and pain improvement has significant difference (p value <0.05) in free flap as compare to regional group patients. But functions like chewing is statistically not significant but improved with time as recovery progress for both groups. **Conclusion**-With comparable complications and functional outcomes, pectoralis pedicled flaps are a useful alternative to free flaps in oral cavity cancer reconstruction.

KEYWORDS

regional flap, free flap, oral cancer, reconstruction

INTRODUCTION

Head and neck malignancy makes up over 5% of all diagnoses of cancer each year. Among all types of cancer, oral and pharyngeal carcinoma make up around 2.5% and 1.2% respectively. An estimated 644,000 new instances of head and neck cancer are identified each year worldwide. More than 90% of head and neck cancers are squamous cell carcinomas (SCC), with mucosal surfaces being the most prevalent site of genesis for these malignancies. Historically, the use of tobacco and alcohol has been linked to 80%- 90% of head and neck malignancies such as squamous cell carcinomas (HNSCCs). Oropharyngeal cancer survival rates have not improved significantly despite therapeutic advances, with a 5-year survival rate of around 60%. Regional flaps were once the primary method for surgical defects after cancer ablation. Microvascular free flap transfer has played the important role in reconstruction of head and neck tumor defects over last 2-3 decades.

Previous studies have revealed that various types of free tissue flaps are suitable for reconstructing resection defects of head and neck tumors. These comprise flaps of the latissimus dorsi (LD), radial forearm (RF), scapular, anterolateral thigh, and rectus abdominis muscles.

The oral cavity reconstruction is a complicated subject it itself reflects complexity of the oral cavity. We are persistently working to improve these reconstruction method to restore the best possible outcome and function for those patients who must undergo complex anatomical structure excision surgically.

AIMS AND OBJECTIVES

- To Assess and Compare functional outcomes in patients undergoing regional flap and microvascular free flap reconstruction in oral malignancy.
- To assess Donor site morbidity.

MATERIALS AND METHODS

- Study design:** This was a Prospective Study.
- Sample size:** 100 individuals were selected for the study.
- Study site-** Study was conducted in Department of General Surgery, Moti Lal Nehru Medical College, Prayagraj.

- Study population** – All patients undergoing surgery for oral malignancy in which reconstruction was done by microvascular free flap or regional flap were included in study in Department of Surgery, Moti Lal Nehru Medical College, Prayagraj were considered as study population.
- Study period and duration-** March 2023 to February 2024.
- Inclusion criteria-** All patients who diagnosed with primary squamous cell carcinoma of oral cavity and undergone primary resection and regional or free flap reconstruction were included for study.
- Exclusion Criteria-** Patients undergoing local or distant flaps for reconstruction were excluded from the study.

DIAGNOSIS AND WORK-UP-

- History taking and examination;
- Biopsy
- Clinical and radiographic staging investigations;
- Comorbidity and functional status;
- Multidisciplinary team (MDT)/tumor board discussion and treatment plan formulation
- Pathological staging
- Adjunctive treatments if appropriate.

Treatment:

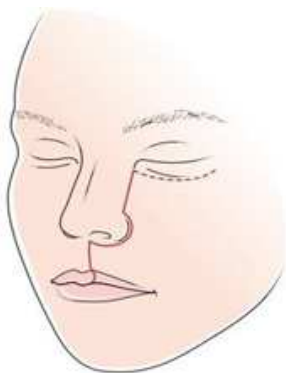
Current options for treatment of oral and pharyngeal (Oropharyngeal) cancers are widely treated by surgically and/or RT, surgery is the only therapeutic treatments for head and neck malignancy. Chemotherapy is used as adjuvant therapy but alone it used, but not curative. The TNM staging system for cancer classification is used to choose correct choice of treatment modality and prognostication. For an oropharyngeal cancer patient the treatment strategy is widely institutionally based.

Surgical Planning

Access surgery- Complete removal of the tumor with adequate margin is the goal in surgical management of OSCC.

- Visor flap approach
- Weber-Fergusson approach
- Lip-split mandibulotomy

- Maxillary resection
- Mandibular resection

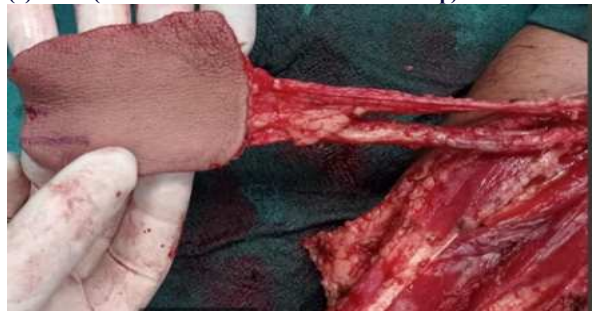


Regional flap- Pectoralis Major Flap-



Free tissue transfers- Free flap transfer has become popular for restoring intraoral defects after surgeries of oral and oropharyngeal cancer. Microvascular tissue flaps are versatile, diverse, and safe, allowing for the incorporation of various types of tissue like skin, fascia, mucosa, muscle, tendon, bone, or nerve. The extensive blood supply promotes rapid and secure healing. The radial forearm free flap and fibular osseo-cutaneous free flap are currently the most suitable for reconstruction of the mandible, oral cavity, and pharynx, despite the availability of different donor sites.

(1) RFFF (Radial Fore arm Fascio-cutaneous Flap)



(2) ALT (Anterolateral Thigh Flap) free flap-



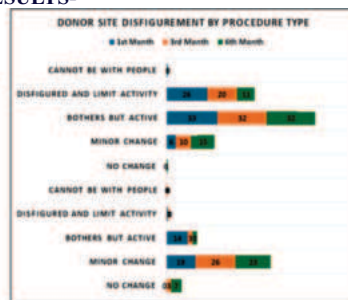
Follow-up And Monitoring:

Post-Treatment Surveillance: Regular imaging to detect recurrence or residual disease. Monitoring for complications of treatment, such as osteoradionecrosis or soft tissue fibrosis.

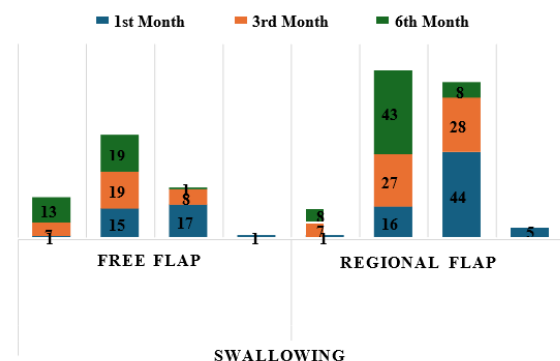
Method of assessment- University of Washington Quality of Life Questionnaire (Hassan and Weymuller, 1993).

OBSERVATION AND RESULTS-

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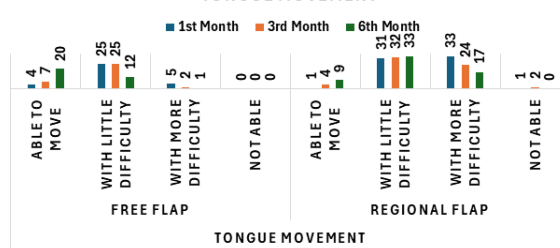


SWALLOWING BY PROCEDURE TYPE



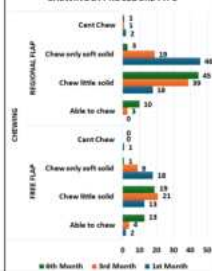
SWALLOWING

TONGUE MOVEMENT

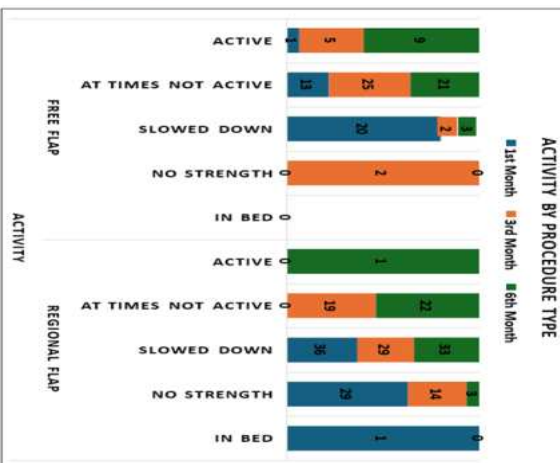
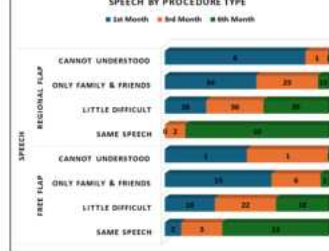


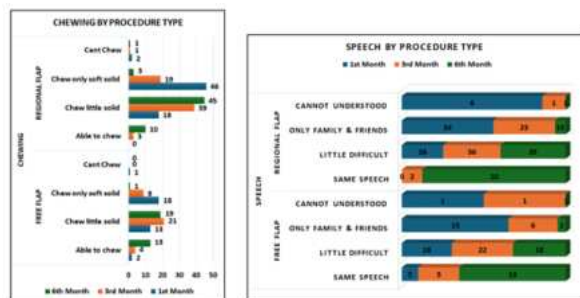
TONGUE MOVEMENT

CHEWING BY PROCEDURE TYPE



SPEECH BY PROCEDURE TYPE





DISCUSSION-

- In our study out of the total 100 cases, 34 involved microvascular free flaps, and 66 involved regional flaps, highlighting the PMMC flap as the dominant choice for reconstructive surgery in oral malignancy case. The variations in sex distribution across the different reconstructive procedures were not statistically significant, with a p-value of 0.319. This indicates that sex was not a determining factor in the choice of reconstructive flap among the patients in this study. **Kim et al.** This study concludes that no significant differences in sex ratio or mean age between the groups of each flap (regional and free flap) ($p = 0.64$ and $p = 0.25$, respectively).
- At the 1st and 3rd month after surgery, the mean speech scores for the Microvascular Free Flap and for the Regional Flap and a p-value of 0.076 and 0.070 indicating no significant difference in speech scores between the two flap types during this early recovery period. At the 6th month after surgery, the mean scores were for the Microvascular Free Flap and for the Regional Flap a p-value of 0.023, indicating significant difference in speech outcomes between the flap types at this later time point. **Chih-Yu Hsing, Yong Kie Wong, et.al.** studied comparative differences between free flap and pectoralis major myo cutaneous flap (PMMF) for reconstruction in oral cavity cancer patients and found that Patients who reconstructed with free flap had better speech.
- In the 1st, 3rd and 6th month after surgery, the mean tongue movement for the Microvascular Free Flap and for the Regional Flap the p-value of 0.001, indicating significant difference between the two flap types during early postoperative period. **Sarin V, Chatterjee A. et.al.** were evaluated the tongue functions after free flap reconstruction and found that for the restoration of the tongue functions to near normal we should aim to the restoration of structural support, bulk, and mobility.
- At the 1st and 3rd month after surgery, the mean swallowing scores for the Microvascular Free Flap and for the Regional Flap a p-value of 0.281 and 0.094 respectively, indicating no significant difference in swallowing scores between the flap types during this early postoperative period. At the 6th month after surgery, for the Microvascular Free Flap and for the Regional Flap the p-value of 0.009, indicating significant difference in swallowing scores between the flap types at this later stage. **Pichit Sittitirai, et.al.** Studied significant difference swallowing functions, between the both free flap or pedicled flaps. And the pectoralis major flap reconstruction resulted in a more inferior swallowing function than the free flap reconstruction
- At the 1st, 3rd and 6th month after surgery, the mean employment for the free flap and for the regional flap. p-value of 0.002, 0.003 and 0.004 respectively, indicating significant differences in employment scores among the different flap types at this early stage.

CONCLUSION-

- This study shows that there was no statistically significant difference in the mean ages across the both groups, this suggests that the type of reconstructive procedure chosen was not influenced by the age of the patients.
- The sex of the patient was not a determining factor in the choice of reconstructive flap among the patients in this study due to inadequate randomization in sample.
- In this study it has been observed that there is a statistically significant improvement in pain scores within free flap group and also observed that there is reduction in pain over time for both groups over the period of six month.
- This study no significant difference has been observed in chewing scores for free flap, but improvement in chewing function in both free flap group and regional flap group is noticed during recovery

period.

- This study demonstrated a significant difference in donor site disfigurement scores for the Microvascular Free Flap group and regional flap. Low donor site disfigurement and morbidity was seen with free flap donor site.
- Our study shows a significant difference in swallowing, speech, in occlusion, activity, tongue movement and employment scores within free flap type group. Gradually decreasing trend of p value indicated improvement in activity and employment observe in both groups, as healing process advanced.
- Our study shows significant differences in survival outcomes between the Microvascular Free Flap and Regional Flap groups. Most of the patients who underwent regional flap reconstruction has high mortality as compare to free flap because at the time of presentation they were having advanced disease and advanced age.
- In our study patients who underwent Pectoralis Major Myo cutaneous flap reconstruction experienced shoulder stiffness and decrease shoulder mobility but it significantly improved over the time with help of physiotherapy and exercise.

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