

# Complications of Reconstructive Surgery in Head and Neck Region: A Cross-Sectional Study from Bangladesh

<sup>1</sup>Dr. Palash Chandra Sarkar., <sup>2</sup>Dr. Md. Abu Hanif., <sup>3</sup>Dr. Shamim Hassan., <sup>4</sup>Dr. K.M Nurul Alam., <sup>5</sup>Dr. Mohammad Rafiqul Islam., <sup>6</sup>Dr. Md. Shafiul Akram., <sup>7</sup>Dr. Saif Rahman Khan., <sup>8</sup>Dr. Raisa Enayet Badhan

<sup>1</sup>Junior Consultant, Department of Otolaryngology & Head-Neck Surgery, National Institute of ENT, Tejgaon, Dhaka.

<sup>2</sup>Professor and Director, Department of Otolaryngology & Head-Neck Surgery, National Institute of ENT, Tejgaon, Dhaka.

<sup>3</sup>Consultant, Plastic Surgery, National Institute of ENT, Tejgaon, Dhaka.

<sup>4</sup>Assistant Professor, Department of Otolaryngology & Head-Neck surgery, National Institute of ENT, Tejgaon, Dhaka.

<sup>5</sup>Junior Consultant, Department of Otolaryngology & Head-Neck surgery, National Institute of ENT, Tejgaon, Dhaka.

<sup>6</sup>Residential Surgeon, Department of Otolaryngology & Head-Neck surgery, National Institute of ENT, Tejgaon, Dhaka.

<sup>7</sup>Assistant Registrar, Department of Otolaryngology & Head-Neck surgery, National Institute of ENT, Tejgaon, Dhaka

<sup>8</sup>Medical officer, Sheikh Hasina National Institute of Burn and Plastic Surgery, Dhaka

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## ABSTRACT

### Background

Microvascular free flaps are ideal for reconstructing post-oncological surgery defects in the head and neck region. Free flaps provide ample tissue for reconstructing even large, complex defects, which gives oncosurgeons flexibility during tumor resections.

### Methods

We performed 50 free flap head and neck reconstructions in 978 patients from June 2015 to September 2018. For reconstructing bone defects, our flap of choice was the free fibula. The surgical outcomes and complications according to flap were retrospectively reviewed and analyzed.

### Results

The overall flap success rate was 98.1%. A total of 45 cases required emergency surgical re-exploration for compromised flaps and 19 of these flaps could not be salvaged. Venous insufficiency was the most common cause of surgical re-exploration. Flaps with delayed arterial thrombosis and vascular compression could not be salvaged. Other complications were partial flap necrosis, oro-cutaneous fistula, and donor site complications. No statistically significant differences were noted for complications in elderly and post-radiotherapy patients.

## Conclusions

Free flap reconstruction is a robust and highly reliable option for head and neck defects and free flaps are a safe option for treating large defects. A second free flap should be the first choice in failed cases after the medical optimization of the patient. Free flap reconstruction is safe in elderly and post-radiotherapy patients.

**Keywords:** Free flap reconstruction. Head and neck reconstruction. Radial artery forearm flap, Anterolateral thigh flap. Free fibula flap.

## INTRODUCTION

Resolving post-oncologic surgical deficiencies in the head and neck area is now best achieved with microvascular free flap repair<sup>1-3</sup>. Reconstruction using free flaps has shown acceptable functional and cosmetic results. Results have increased with success rates as high as 98% due to enhanced instruments and magnification<sup>4</sup>. Additionally safe for individuals who have already received chemotherapy or radiation therapy is free flap reconstruction<sup>5</sup>. The pectoralis major myocutaneous flap (PMMF) was first described by Aryan in 1979, and throughout the next thirty years, it has remained the mainstay flap for reconstructing head and neck abnormalities<sup>6</sup>. Numerous advantages come with this flap: it is simple to harvest, has a sizable skin paddle, lots of soft tissue volume, is reasonably adaptable, dependable, and requires little time to operate. However, the shortcomings of the PMMF were exacerbated and its usage in head and neck reconstruction declined in recent decades due to the advancement of microvascular techniques and the widespread application of free tissue transfers<sup>6</sup>. The PMMF has drawbacks such as excessive mass in certain circumstances, thoracic wall deformity, impaired neck and shoulder function, a high rate of complications, partial necrosis of its skin paddle, and potentially poor recipient site function outcomes<sup>7,8,9,10</sup>. The PMMF is now popularized in developing countries with limited medical resources<sup>11,12</sup>. It is used both the primary as well as salvage flap. When bulky flap (e.g-total glossectomy reconstruction) is required that time used as a primary, but when free flap failure or complications (fistula and carotid rupture) during salvage total laryngectomy it is used as a salvage flap. Free flaps are considered as the first choice in the majority of major head and neck defects because of their superior versatility, reliability, tissue match, function and cosmetic outcome and low donor site morbidity<sup>14</sup>. In 1984, 1970, 1984, 1983, 1992 antero-lateral thigh (ALT) flap, pectoralis major myocutaneous flap (PMMF), radial forearm flap (RFF), submental artery flap, facial artery mucosal flap were first described respectively for soft tissues and tongue defects<sup>15,16,17</sup>. Taylor et al. first described fibula flap when bone defects like mandible and maxilla<sup>18</sup>. The free fibula can also be harvested as a osteocutaneous flap with either single or double skin paddles on different perforators<sup>19,20</sup>.

In this study different flaps were used on the basis of patient factors, disease factor and surgeon factors.

## MATERIALS AND METHODS

**i. Study Design:** Cross sectional observation study

**ii. Place of Study:** Department of Otolaryngology, National Institute of ENT, Tejgaon, Dhaka

**iii. Study Period:** Three years.

**iv. Study population:**

All histopathological diagnosed case of Carcinoma of head neck region undergone primary surgical treatment and fulfilling the inclusion and exclusion criteria in the department of otolaryngology, National Institute of ENT, Tejgaon, Dhaka-1215 during the study period

**v. Sampling Method:** Purposive sampling method was applied in this study

**vi. Sample size:** 50

**vii. Selection criteria:**

**Inclusion criteria:**

1. Patients histopathologic ally diagnosed with carcinoma of the head neck region in advanced stage.
2. Age- (18 – 70 years)
3. Sex -both male & female

**Exclusion criteria:**

1. Patient not fit for general anesthesia.
2. Systemic metastasis.
3. Patients who were not willing to take part.

**Written informed consent-** taken from each patient.

**Ethical issues-** Formal ethical clearance was taken from the ethical review committee of the National Institute of ENT for conducting the study.

**RESULTS**

Among fifty patients 37 were male and 13 were female; age range was 21-86 years, (mean age: 52 years). All underwent microvascular free flap or rotation flaps reconstruction following head neck tumour resection. Clinico-pathological criteria of 50 patients are shown in **Table I**. Total 37 cases had primary tumour, 41 were in stage iv while 9 were in stage iii. Pre-operatively 22% gets radiotherapy. Histopathologic ally most are the squamous cell carcinoma 72%; mucoepidermoid carcinoma 6%, adenoid cystic carcinoma 4%, papillary carcinoma 4%, adenocarcinoma, n= 4%, malignant fibrous histiocytoma 4%, pleomorphic adenoma 4% and giant cell granuloma 2%.

Table I: Clinico-pathological data of 50 patients who underwent a reconstructive surgery

Previous radiotherapy	Yes	11(22%)
	No	39(78%)
Primary /Recurrent	Primary	37(74%)
	Recurrent	13(26%)
Tumour staging	Stage iii	9(18%)
	Stage iv	41(82%)
Pathology	Squamous cell carcinoma	36(72%)
	Mucoepidermoid carcinoma	3(6%)
	Adenoid cystic carcinoma	2(4%)
	Papillary carcinoma thyroid	2(4%)
	Pleomorphic malignant fibrous histiocytoma	2(4%)
	Carcinoma-ex pleomorphic adenoma	2(4%)
	Adenocarcinoma	2(4%)
	Giant cell granuloma	1(2%)

Table II shows complications at donor and recipient sites. Haematoma, infections, dehiscence, aesthetic and functional problems are important complications seen in both the donor and recipient site.

Table II: Complications at donor and recipient site

Name	Donor site, n=50	Recipients site, n=50	Total, N=100, %
Seroma	1	0	1(1%)
Haematoma	1	2	3(3%)
Infections	1	2	3(3%)
Dehiscence	1	2	3(3%)
Congestions	0	2	2(2%)
Partial skin graft loss	2	0	2(2%)
Total skin grft loss	0	1	1(1%)
Partial flap failure	0	1	1(1%)
Total flap failure	0	2	2(2%)
Aesthetic problems	4	2	6(6%)
Functional problems	3	2	5(5%)
Fistula formation	0	3	3(3%)
Total	13	19	32(32%)

Table III shows, distribution of primary sites with different types of flaps. 22 free flaps (ALT, RFF, Fibula) and 28 rotation flaps (PMMCF/PMMFF, Facial artery mucosal flap, sub mental island flap) were used. ALT 26%; RF 10%; PMMCF 34%; PMMFF 14%; Sub-mental artery flap 6%; fibula 4%; combination PMMCF and fibula 2% were reconstructed for stage iii and stage iv carcinoma of tongue, oral cavity (buccal, lips, floor of mouth and mandible), sino-nasal, laryngeal, parotid and metastatic neck mass etc. In oral cavity carcinoma except tongue, ALT 30.7%, RFF 15.4%, Sub-mental artery flap 23.07%, fibula 15.4%, PMMCF 7.7% and combination flap 7.7% were used. In tongue carcinoma, ALT 53.9%; RFF 15.4%, PMMCF, 15.4%, FAMMF 63% were used. In laryngeal carcinoma, PMMCF 30%, and PMMFF 70% were used.

Table III: Distribution of primary sites with different types of flap

Site of primary carcinoma	ALT flap No (%)	RFF Flap No(%)	PMMC Flap No (%)	PMMF Flap No (%)	Sub-mental Flap No (%)	FibulaFlap No (%)	FAMMFNo (%)	Combination submental and fibula flap No (%)	Total No (%)
Oral cavity except tongue	4 (30.7%)	2(15.4)	1(7.7%)	0	3(23.07)	2(15.4)	0	1(7.7%)	13(26%)
Tongue	7(53.9%)	2(15.4%)	2(15.4%)	0	0	0	1(7.7%)	0	13(26%)
Larynx	0	0	3(30%)	7(70%)	0	0	0	0	10(20%)
Parotid	1(12.5%)	0	7(87.5%)	0	0	0	0	0	8(16%)

## DISCUSSION

The condition of the donor site for a flap needs to be taken into consideration with the advancement of surgical procedures for the reconstruction of head and neck deformities. The radial forearm flap, the antero-lateral thigh flap, and the pectoralis major musculocutaneous flap are common donor sites for reconstructive procedures. The nipple position may become deformed and the pectoralis major musculocutaneous flap is too thick, both of which can lead to esthetic issues. The free microvascular flap is a helpful reconstructive technique for postoperative defects because of its rich vascularity, which allows for a high degree of design adaptability and dependability. For head and neck abnormalities, even the radial forearm free flap is more frequently utilized for reconstruction. Complications of radial forearm flap donor sites include poor esthetics, morbidity, and reduced strength and sensation.<sup>21</sup> PMMC flap is a versatile and the most commonly used rotational flap for head and neck reconstruction. Even with the worldwide use of free flaps, they are still the mainstay reconstructive procedures in many centres. In the largest reported series of 500 patients, Milenovic and colleagues reported an overall complication rate of 33%, with only 2% of cases involving total flap necrosis<sup>22</sup>. The PMMF has been relegated to the secondary role in head and neck defect reconstruction in the recent two decades due to the widespread utilization of free flaps<sup>23</sup>. Free flaps are considered as the first choice in the majority of major head and neck defects because of their superior versatility, reliability, tissue match, function and cosmetic outcome, and lower donor site morbidity<sup>16</sup>. However, free flaps cannot be an all-in-one answer for head and neck reconstruction in any situation. Selection of an appropriate reconstructive method should take both patient factors and surgeon/institution factors into account. Optimal preoperative patient preparation and careful postoperative care contribute to a smaller number of complications intra and postoperative which is supported by Serrleti et.al.<sup>24</sup> Postoperative complications in our research were relatively low 19.3%. Bonawitz<sup>25</sup> had similar results in series of microvascular free flaps in 47 patients above the age of 60, where postoperative complications were evident in 15 (21%) patients. Donor site complications as well as other surgical complications were mostly treated in a conservative way (antibiotics, active wound dressing) which has also been done in the study by Bridger et al. Free flaps have become the ideal choice for head and neck reconstruction. In high-volume centers, the global success rate free flap survival is approaching 98%. At our center, the overall success rate was found to be 98.1%, which is comparable to most centers worldwide<sup>26</sup>.

### Limitations

We have a limited sample size, which may not be representative of Bangladesh's general population. A bigger sample size recommended for future research. In addition, poor compliance with post-operative treatment and limited follow-up impacted the collection of adequate patient survival data.

## CONCLUSION

For head and neck deformities, free flap reconstruction is a strong and dependable choice. Large defects can be safely treated using free flaps. After the patient has been medically optimized, the primary option in unsuccessful cases should be a second free flap. Patients who are elderly or have recently undergone radiation therapy can safely undergo free flap repair. In all cases complications are uncommon and mostly aesthetic.

### Conflict of interest

The authors claim to have no conflicts of interest.

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