

# PECTORALIS MAJOR MYOCUTANEOUS FLAP IN HEAD AND NECK SURGERY

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## SUMMARY

The experiences gained through the use of pectoralis major myocutaneous flap in reconstructive head and neck cancer surgery in 15 cases is presented. It is our method choice for a one-stage reconstruction in head and neck. The flap has survived in 14 out of 15 cases. It has definite advantages over other flaps used in head and neck reconstruction.

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## INTRODUCTION

The pectoralis major myocutaneous flap is an axial flap which is versatile, reliable and permits reconstructive surgery for head and neck cancer as a primary procedure. It has definite advantages over other myocutaneous flaps used in this region. It provides skin and muscle to cover defects after resection of the temporal bone, in the craniofacial region, maxilla, cheek, oral cavity, floor of mouth, tonsillar fossa, pharynx, oesophagus and neck.

In this paper, we present our experiences with 15 patients where the pectoralis major myocutaneous flap was utilised in reconstructing head and neck defects following ablative cancer surgery.

## Literature Review

Tansini<sup>1</sup> reconstructed the breast following radical mastectomy using the first latissimus dorsi muscle and skin flap. Owens<sup>2</sup> used the sternomastoid myocutaneous flap to repair a facial defect. Bakamjian<sup>3</sup> reconstructed the palate following maxillectomy using the same flap. McGregor<sup>4,5</sup> used an arterially-based forehead flap and a groin flap and defined both axial and random pattern skin flaps. The upper trapezius muscle in addition to the sternomastoid was utilised in the same area by McGraw *et al.*<sup>6</sup> Quillen<sup>6</sup> repaired head and neck defects with

the latissimus dorsi myocutaneous island flap. Ariyan<sup>7,8,9</sup> introduced the pectoralis major myocutaneous flap to head and neck surgery.

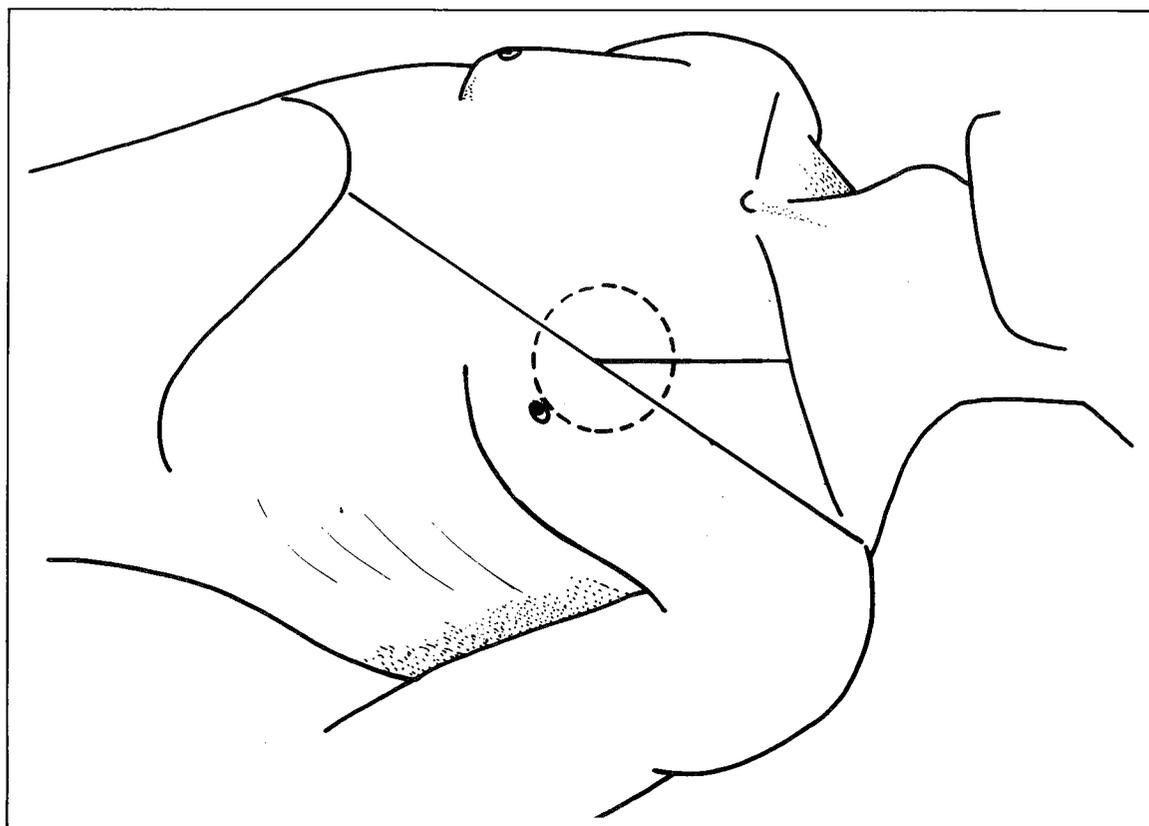
### Anatomy of Pectoralis Major

The pectoralis major is a flat triangular fan-shaped muscle lying on the anterior and superior aspect of the chest wall. It arises from anterior medial half of clavicle; anterior surface of the sternum and adjacent upper six costal cartilages and the external oblique muscle aponeurosis. It courses laterally and rotates through a 90° arc and is inserted into the lateral lip of the bicipital groove of the humerus, anterior lip of deltoid tuberosity and deep fascia of the arm.

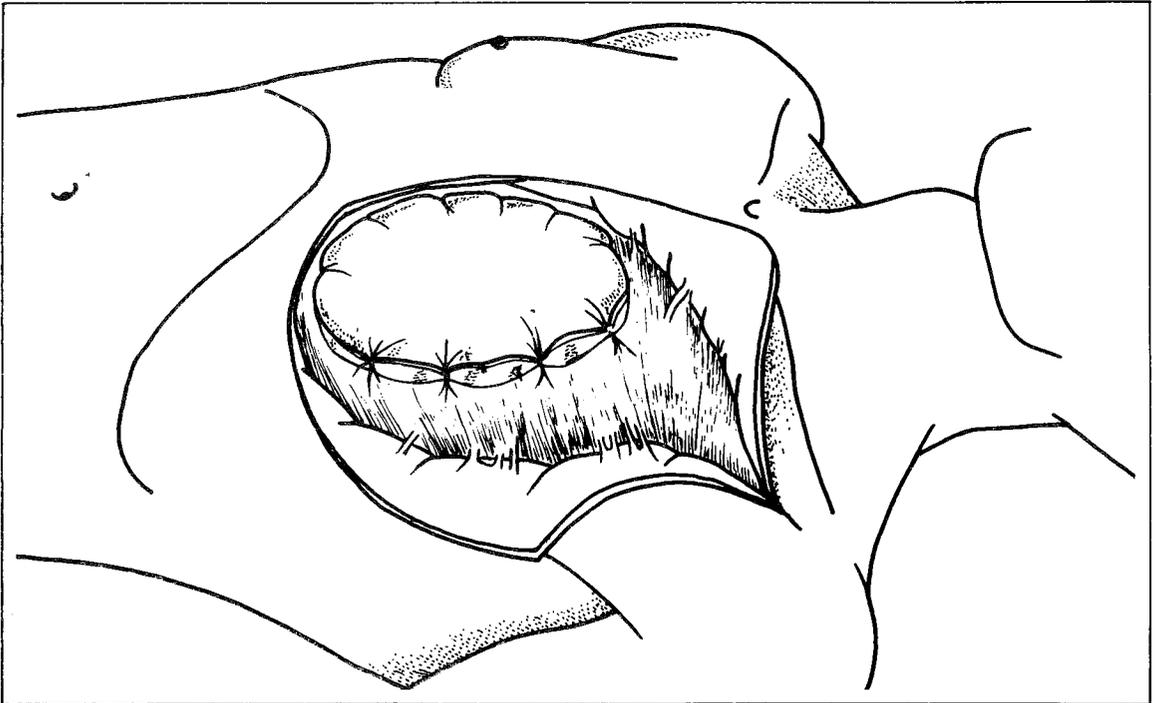
It is a medial rotator and with the latissimus dorsi is a powerful abductor of the arm.

The dominant arterial supply of the pectoralis major is from the thoracoacromial artery which arises from the second part of the axillary artery medial to pectoralis minor, pierces the clavipectoral fascia and divides into the pectoral, acromial, deltoid and clavicular branches. The pectoral branch is the largest and descends on the under surface of the pectoralis major and anastomoses with the internal mammary artery and the lateral thoracic artery. It is also the main cutaneous blood supply from the midline to the anterior axillary line and from the clavicle to the level of the sixth rib.

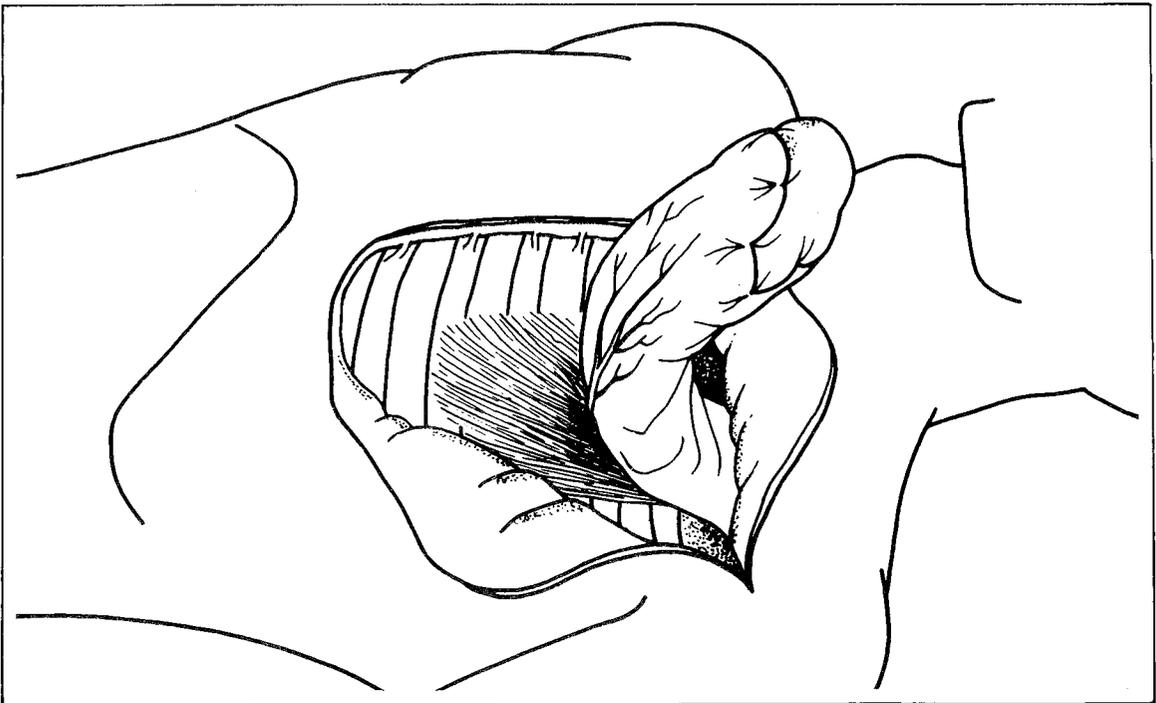
### Design of Flap and Techniques



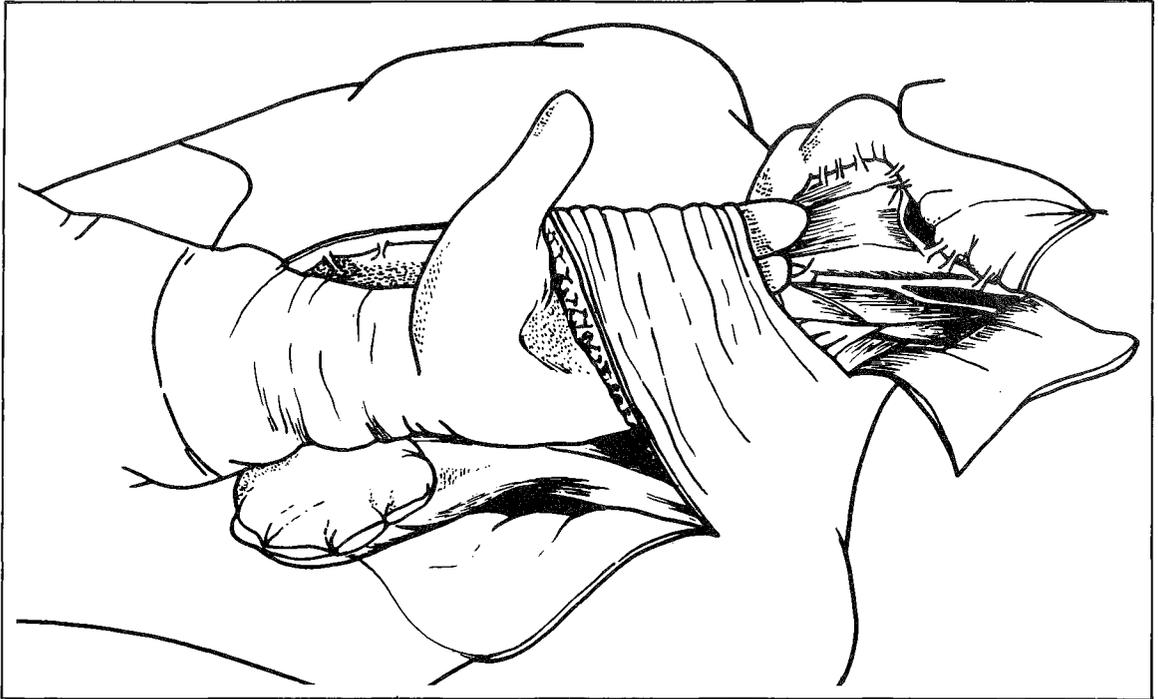
**Fig. 1** A line dropped from the centre of the clavicle bisecting the line joining the acromial end of the clavicle to the tip of the xiphoid process maps the vascular axis of pectoral branch of the thoracoacromial artery. An area corresponding to the size and configuration of the donor area is mapped.



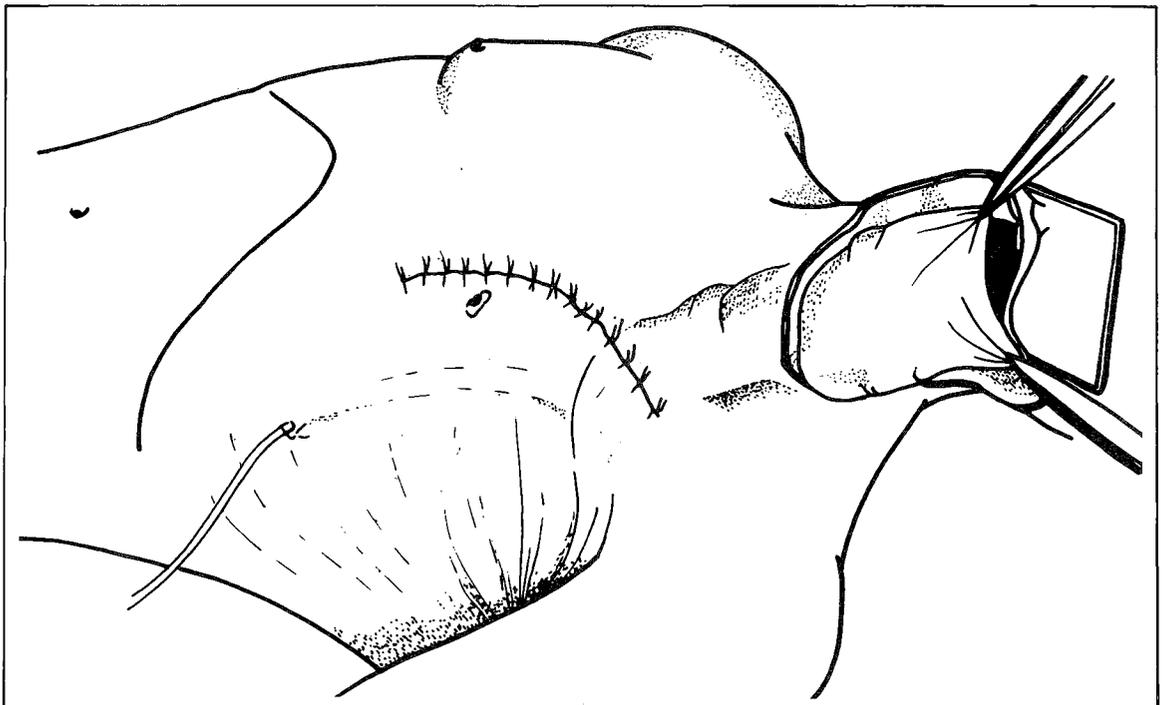
**Fig. 2** This area is incised and deepened to the pectoralis major and extended to the deltopectoral groove. Temporary sutures are placed between the skin and muscle.



**Fig. 3** The pectoralis major myocutaneous flap is elevated from its bed exposing the vascular pedicle. The muscle is trimmed on both sides of the vascular pedicle up to the clavicle.



**Fig. 4 . The skin muscle flap is passed through a subcutaneous tunnel to the recipient area.**



**Fig. 5 A Redivac drain is inserted and the flap is sutured in three layers. The donor area defect is closed primarily.**

## MATERIALS AND METHODS

Resection of tumours in the head and neck and reconstruction of the defect with the pectoralis major myocutaneous flap were performed in 15 patients.

The cases treated are summarised in Table I.

The ages of the patients ranged from 38–65 years. There were nine men and six women. Five patients who had previous radiotherapy presented with recurrence or residual tumours. All our cases were squamous cell carcinomas. In one patient, the deltopectoral flap was used to resurface a pharyngeal defect following resection for hypopharyngeal carcinoma and the neck defect was closed with a pectoralis major flap. There were two complications in these 15 cases. One had necrosis of the flap which was later resurfaced with the contralateral pectoralis major flap. Another patient developed a salivary fistula which closed spontaneously. The third developed

secondaries in the hilar region of the right lung three months after the primary surgery and died six months later.

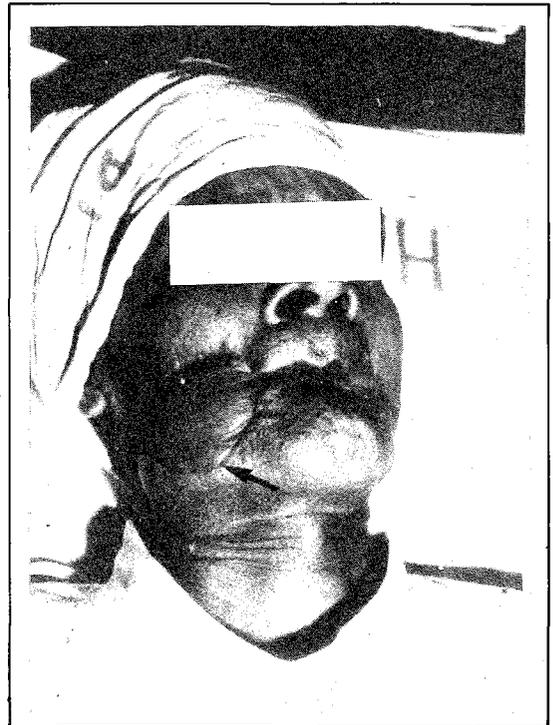
## DISCUSSION

In our experience, the pectoralis major myocutaneous flap permits a one-stage reconstruction of the defect following extensive resection in the head and neck and with less morbidity. The flap may be elevated for some distance with its blood supply with a strip of overlying muscle. The blood supply is excellent. The muscle bulk fills cavities, provides structural support and gives a good cosmetic result at the extensive tissue ablation. It also provides cover for the exposed carotid artery.

The patient is ambulatory soon after surgery. It gives good cosmetic result in women especially in older women with atrophic breasts. Since the blood supply to the muscle is not disturbed by simultaneous use of deltopectoral flap, the



Pre operative



Post operative

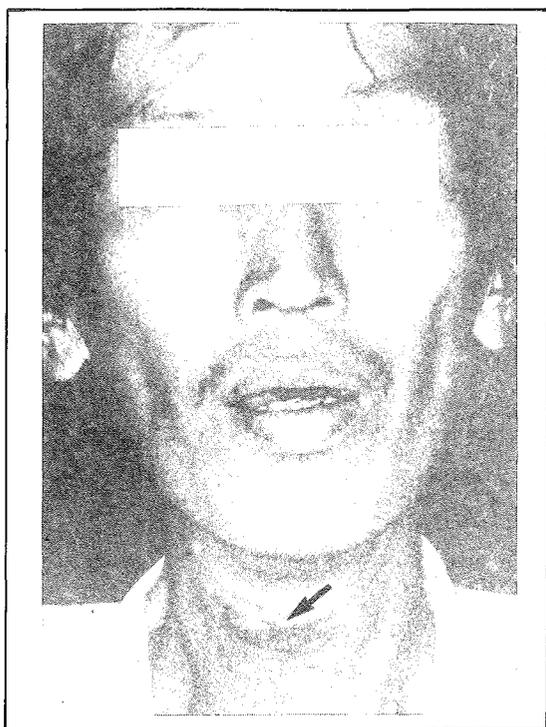
**Fig. 6 Carcinoma (R) cheek (Case 2).**

**TABLE I**  
**SUMMARY OF THE 15 CASES TREATED**

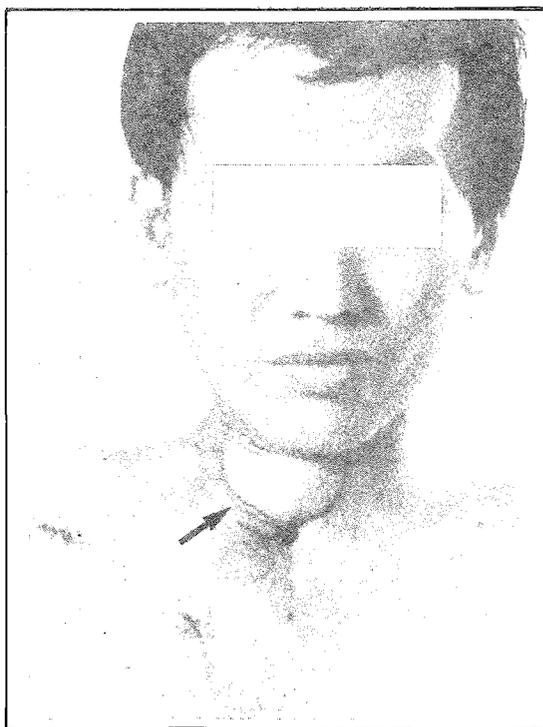
Case Number	Age/Sex*	Diagnosis**	Operation	Result
1	48/M	Carcinoma (R) maxilla with skin involvement (Post irradiation)	Total maxillectomy with excision of skin and closure of skin defect with PM flap.	Satisfactory
2	65/M	Carcinoma (R) cheek	Resection of cheek and closure with PM flap.	Satisfactory
3	48/F	Osteoradionecrosis (R) maxilla with discharging sinus over the skin (Post irradiated carcinoma maxilla)	Total maxillectomy with excision of skin and closure of defect with PM flap.	Satisfactory
4	38/F	Carcinoma anterior floor of mouth involving arch of mandible with metastasis in submaxillary nodes	Resection of growth and mandible, suprahyoid dissection and closure with PM osseo myocutaneous flap (fifth rib).	Satisfactory
5	40/M	Carcinoma (R) angle mouth	Resection of growth and closure with PM flap.	Satisfactory
6	65/M	Transglottic carcinoma larynx with metastasis (R) upper cervical nodes with skin involvement	Total laryngectomy (R). Radical neck dissection with excision of skin. Defect closed with PM flap.	Satisfactory
7	38/F	Postcricoid and pyriform sinus carcinoma metastasis (R) upper cervical nodes with skin involvement	Total pharyngolaryngectomy with (R) block dissection and skin excision. Pharynx reconstructed with deltopectoral flap and skin defect with PM flap.	Necrosis PM flap. Defect repaired with contralateral PM.
8	45/M	Transglottic carcinoma larynx with metastasis (L) cervical nodes	Total laryngectomy with (L) radical neck dissection, excision of skin and reconstruction with PM flap.	Satisfactory
9	45/M	Carcinoma larynx infiltrating thyroid gland and skin with metastasis (R) cervical node (Post irradiation)	Total laryngectomy, total thyroidectomy, (R) block dissection. Defect closed with (R) PM flap.	Satisfactory, pulmonary metastasis 3 months later. Died 6 months later.
10	55/M	Carcinoma (L) cheek	Excision of growth, reconstruction with PM flap.	Satisfactory
11	45/F	Carcinoma (R) cheek involving angle of mouth	Resection and reconstruction with PM flap.	Satisfactory
12	54/F	Carcinoma (R) maxilla with skin involvement	Total maxillectomy with excision of skin. Reconstruction of skin defect with PM flap.	Satisfactory
13	64/F	Carcinoma (R) cheek with orocutaneous fistula	Resection of cheek and reconstruction with PM flap.	Satisfactory
14	38/F	Carcinoma anterior floor mouth and mandible	Resection floor of mouth and mandible. Reconstruction with PM flap and fifth rib.	Satisfactory
15	60/M	Carcinoma (R) maxilla with skin involvement	Total maxillectomy and reconstruction of skin defect with PM flap.	Satisfactory

\* M — male; F — female.

\*\* R — right; L — left.

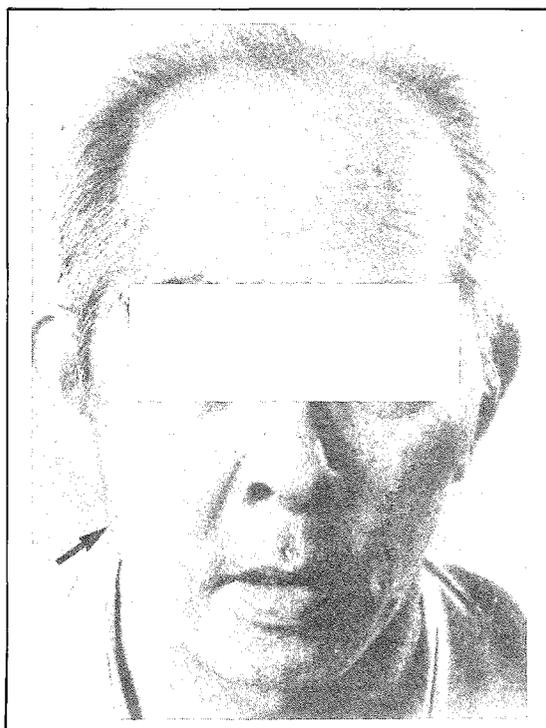


Pre operative

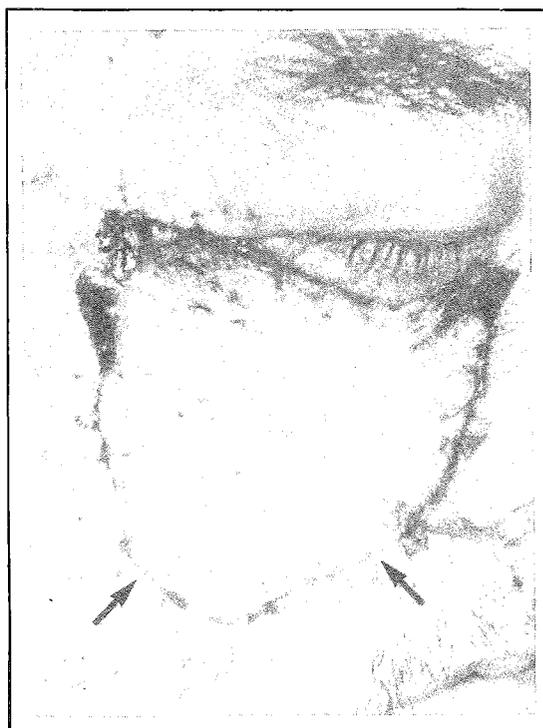


Post operative

**Fig. 7 Carcinoma larynx (Case 9).**



Pre operative



Post operative

**Fig. 8 Carcinoma (R) maxilla (Case 15).**

pectoralis major flap can be combined with the deltopectoral flap from the same side. In addition to transferring large portions of muscle and skin, it can also be used with an attached segment of an underlying rib which may be necessary in reconstruction of the mandible. It is unaffected by previous irradiation to the head or neck. Scarring in the head, neck and chest is minimal. The donor site can be closed primarily by advancing the adjacent skin without the use of skin grafts.

The pectoralis major myocutaneous flap has definite advantages over other myocutaneous flaps used in closing head and neck defects.

The trapezius myocutaneous flap requires a skin graft to the donor area and there is a temporary orocutaneous fistula. It has a limited arc of rotation and a division of the flap is necessary as a second procedure.

The latissimus dorsi myocutaneous flap requires a change in the patient's position during the operation. Its arc of rotation is limited and it does not reach the craniofacial area without tunnelling under the skin of the chest wall which is a good donor skin site if required later.

The sternomastoid myocutaneous flap has limited skin. Its arc of rotation limits it to the neck and oropharynx. Further it cannot be used in radical neck dissection when the sternomastoid needs to be resected because of fixation of the nodes to the muscle.

The deltopectoral flap needs a wide base and requires skin graft to the donor area. It will not reach the upper head and the forehead flap leaves an unsightly scar.

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## REFERENCES

- 1 Tansini I. Sopra il mio processo di amputazione della mammella. *Gazzetta Medica Italiana* 1906; 57: 141.
- 2 Owens N. A compound neck pedicle designed for repair of massive facial defects: Formation, development and application. *Plast Reconstr Surg* 1955; 15: 369.
- 3 Bakamjian N Y. A technique for primary reconstruction of the palate after radical maxillectomy for cancer. *Plast Reconstr Surg* 1973; 31: 103-117.
- 4 McGregor I A, Morgan G. Axial and random pattern flaps. *Brit J Plast Surg* 1973; 26: 202-213.
- 5 McGregor I A, Jackson I T. The groin flap. *Brit J Plast Surg* 1973; 26: 202-213.
- 6 McGraw J B, Magee W P, Kalwaic H. Uses of the trapezius and sternomastoid myocutaneous flaps in head and neck reconstruction. *Plast Reconstr Surg* 1979; 63: 49-57.
- 7 Ariyan S. The pectoralis major myocutaneous flap. A versatile flap for reconstruction in the head and neck. *Plast Reconstr Surg* 1979; 63: 73-81.
- 8 Ariyan S. One-stage reconstruction for defects of the mouth using a sternomastoid myocutaneous flap. *Plast Reconstr Surg* 1979; 63: 618-625.
- 9 Ariyan S. Further experiences with the pectoralis myocutaneous flap for the immediate repair of defects from excision of head and neck cancers. *Plast Reconstr Surg* 1979; 64: 605-612.