



One Approach, Three Procedures: The Cervicofacial/Pectoral Rotation Flap in Maxillofacial Oncologic Surgery

*Zoilo Núñez-Gil¹, Kocsin Santana²

^{1,2}Oral and Maxillofacial Surgeon, Instituto Nacional del Cáncer Rosa Sánchez Pérez de Tavares -INCART.

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*Corresponding author: [Zoilo Núñez-Gil](#)

Oral and Maxillofacial Surgeon, Instituto Nacional del Cáncer Rosa Sánchez Pérez de Tavares -INCART.

Abstract

SUMMARY

Reconstruction of large soft tissue defects in the cheek and orbital region is a difficult task. A good functional and aesthetic result must be achieved.

The cervicofacial (CF) rotation flap and its variant the cervicopectoral (CP) flap have many advantages; they are easy, quick and safe to raise, and are compatible with cervical dissection and radiotherapy. The cervicofacial and cervicopectoral rotation flaps are very versatile flaps that can be applied to a variety of defects of the cheek, orbit, periauricular region and neck. These advancement and/or rotation flaps should be a staple of the head and neck surgeon's reconstructive armamentarium.

This article describes our experience with the single-incision technique of the cervicofacial/pectoral flap in patients with head and neck cancer, especially in the middle third of the face, with neck dissection and reconstruction, in a single surgical stage.

Keywords: cervicofacial flap, cervicopectoral flap, facial defects, reconstruction.

INTRODUCTION

Due to its prominent position, the midface is susceptible to tumours and traumatic injury and reconstruction of a defect in this region can present a challenge for any maxillofacial surgeon. Although full-thickness defects often require free flap reconstruction, a defect can be repaired with various local and regional flap techniques.

Facial reconstructive surgeons try to achieve the balance of colour, texture, and contour while avoiding facial nerve injury and overly visible scarring. We will look at the versatility of this flap for tumor removal, neck dissection, and facial reconstruction.

The cervicofacial/pectoral (CF/P) flap is classified as an advancement and/or rotation flap, based on a random blood supply. (1)

Multiple variations and modifications of the CF/P flap have been described since its initial introduction. Esser first described the use of a rotation flap to close cheek defects in 1918. (2) Beare performed it with a posterior pedicle as an alternative to close defects with orbital exenteration. (3) Mustardé described the use of an advancement and rotation flap for lower eyelid reconstruction. (4) Garrett *et al.* (5) describe a posteriorly based cervicopectoral flap and Becker (6) described an anteriorly based cervicopectoral flap.

These flaps have proven advantageous due to their ability to cover large surgical or traumatic defects using a single-stage procedure. Accepted arises with these flaps due to their random blood supply, which can lead to distal edge necrosis after mobilizing soft tissue with extensive subcutaneous dissection.

Anatomy and Technique

The anatomy of the anteriorly based CF/P flap is based on a random blood supply arising from the subdermal plexus. The arterial supply varies depending on whether the flap is anteriorly or posteriorly based and is derived from the facial, submental, superficial temporal, transverse cervical, suprascapular, and internal mammary perforator arteries. The venous supply is variable and drains into the anterior and external jugular veins. The superficial musculoaponeurotic system (SMAS) is the superficial fascia of the face and is composed of a fibromuscular layer of connective tissue that extends from the platysma, envelops the muscles of facial expression, and continues superiorly to continue with the galea. In the cheek region, branches of the facial nerve are deep to the SMAS, and therefore dissection during the cervicofacial flap proceeds immediately superficial to the SMAS, protecting the facial nerve from injury.

This is important as the flap is then anchored to the deep tissues in this region so that all tension is distributed here to prevent ectropion. We dissect the flap entirely in the subcutaneous plane and wide enough to limit tension.

MATERIALS AND METHODS

A retrospective analysis was performed of head and neck defects reconstructed using an anteriorly based cervicofacial/pectoral fasciocutaneous rotation flap in 15 patients, ranging in age from 34 to 85 years old, treated at the Instituto Nacional del Cancer Rosa Tavez -INCART- between August 2017 and October 2024. All patients were staged using TNM classification.

A single incision was made for tumour removal, defect reconstruction, and neck dissection when indicated, this was performed by the same surgeon in a single session. The procedures were performed under general anaesthesia in all patients. Patient data and operations performed are recorded.

All defects were reconstructed with a Cervicofacial/Pectoral flap. The design of the CF/P flap was modified depending on the area of the defect without extending it to the preauricular or retroauricular region to avoid skin necrosis of this portion of the flap due to neck dissection. Various anatomical regions were reconstructed, including the orbital region, the parotid region, the cheek region, the occipital region, the cervical region, and the auricular region.

The flap was elevated deep to the superficial musculoaponeurotic system (SMAS) in the parotid region and deep to the platysma in the neck. When the anterior margin of the parotid gland was reached, care was taken not to injure the branches of the facial nerve.

The great auricular nerve was preserved as much as possible during flap elevation. Wedge excision of the skin medially was required to remove excess skin (dog ear).

RESULTS

General characteristics of the patients, the site of the lesion, the procedures performed and the results obtained are summarized in Table 1. Computed tomography and tissue biopsy were performed in all patients. The removal of the tumours caused cutaneous, myocutaneous and muco-myocutaneous defects in all cases. All defects were reconstructed with a cervicofacial/pectoral flap.

The reconstructed defects were 15 distributed as follows: 2 from the orbital region (fig. 1), 2 from the parotid region (fig. 2), 8 from the cheek -2 full-thickness cheek defects- (fig. 3 and 4) and 1 based posteriorly (fig. 5) -, 1 from the occipital region, 1 from the cervical region and 1 from the auricular region.

TABLE I. Cases performed at INCART 2017-2024.

Patient	Sex	Age	Histopathology	Location	Surgery performed	Cervical Dissection	Complications
1	M	81	Ca Spinocellular	Zygomatic region skin	WR+CFF	NO	None
2	M	45	Sebaceous adenoma	Parotid region	Parotidectomy superficial+CPF	NO	Scar band
3	F	62	Adenocystic Carcinoma Recurrence	Parotid region	RA+superficial parotidectomy+CFF	NO	None
4	M	75	Ca Spinocellular	Eyelid cavity + orbital cavity extension	Orbital excenteration + orbitectomy + Superficial parotidectomy + TMF + CPF	Lateral dissection	Crumbling Minor Cutaneous
5	F	30	Melanoma Recurrence	Occipital region scalp	WR+ CPF	Posterolateral dissection.	Thoracic duct injury
6	M	56	Ca Spinocellular	Tongue + cervical skin extension	Hemiglossectomy + ECMF + CPF	Radical dissection	Scar band
7	M	82	Ca Spinocellular	Mandibular triangle	Segmental mandibulectomy+ PMF+ CPF	Modified radical dissection.	None
8	M	85	Ca Spinocellular	Auricle	RA+Parotidectomy + CPF	Posterolateral dissection	None
9	F	74	Ca Spinocellular post QT and RT	Retromolar triangle with cutaneous extension to cheek	Side-to-side WR + Segmental mandibulectomy + CPF	Supraomohyoid dissection	None
10	F	76	Ca Spinocellular	Cheek	RA+CPF	Lateral dissection	Death
11	F	78	Ca Spinocellular	Cheek	WR Side to Side + CPF	Modified radical dissection.	Moderate skin Crumbling
12	F	53	Ca Spinocellular	Maxillary sinus with extension to cheek	Hemimaxillectomy+ TMF+CFF	Supraomohyoid dissection	None
13	M	62	Basal Cell Carcinoma Recurrence	Cheek	WR+PBCFF	No	None
14	F	65	Ca Spinocellular	Maxilla with skin extension to cheek	WR + Maxillofacial Surgery + MTF + CFF	Supraomohyoid dissection	None
15	F	78	Adenocarcinoma	Parotid with extension to skin	WR+superficial parotidectomy +CFF	No	None

WR: Wide resection. CPF: Cervicopectoral flap. PBCFF: Posteriorly based cervicofacial flap. ECMF: Splenius capitis muscle flap. CPM: Pectoralis major flap. CMT: Temporal muscle flap.



Fig. 1: Cervicopectoral flap for orbit reconstruction.



Fig. 2: Cervicopectoral flap for auricular reconstruction.



Fig. 3: Cervicofacial flap for cheek reconstruction.



Fig. 4: supraomohyoid neck dissection and Cervicopectoral flap for full-thickness cheek defects reconstruction.

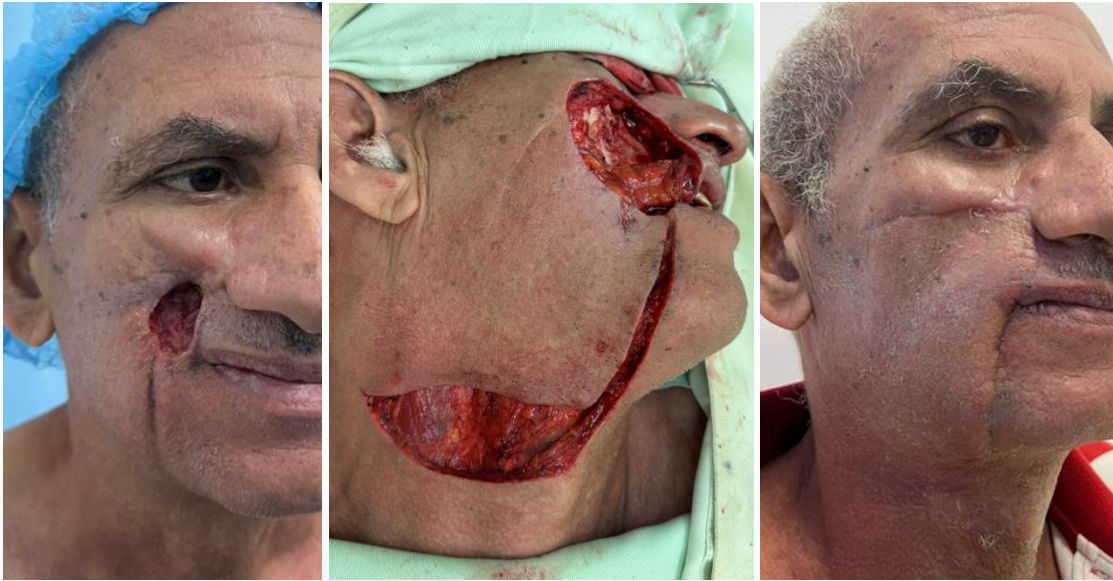


Fig. 5: Posterior based cervicofacial flap for cheek reconstruction.

Elective neck dissections were performed in patients with palpable lymph nodes and staging indications. Lymph nodes were clinically present in two cases. In these two patients, a radical neck dissection and a posterolateral neck dissection were performed. All parotid gland tumours had skin invasion. The facial nerve was preserved during parotidectomies. Tumours larger than 4 cm (T4a) or positive surgical excision margin were completed with radiotherapy. There were no major complications such as flap loss, total or partial necrosis, wound dehiscence, or infection. One patient had mild epidermal necrosis at the lateral edge of the flap that healed spontaneously within two weeks, and one developed a scar band. There was one postoperative death.

DISCUSSION

Large defects of the head and neck represent a challenge for surgeons, especially when a cervical dissection and/or parotidectomy are necessary. There are several surgical weapons such as primary closure, skin graft, healing by secondary intention, pedicle flaps and free grafts (7,8,11,13,16,17). On the other hand, local skin flaps are the most suitable method in terms of simplicity. (12)

A person's face is a critical aspect of their identity and social interactions. A major deformity secondary to injury or iatrogenic resection can have a devastating toll on the quality of life and continues to challenge reconstructive surgeons to restore a harmonious appearance.

Cheek reconstruction is achieved using a variety of these methods. Cheek restoration should focus primarily on uniformity of skin colour and texture and secondarily on attempting to duplicate the contour of the contralateral cheek.

In our study, two flaps were used for reconstruction: the cervicofacial flap and the cervicopectoral variant. Liu et al. used the first in lesions of 1.5 cm x 1.5 cm to 7 cm x 6 cm; and the cervicopectoral flap in lesions of 3 cm x 2 cm to 16 cm x 7 cm (13). The CF/P flap, when used in very large defects where a bulge is also needed, must be complemented with a rotation of the pectoralis major without the skin island (7, 8,13).

Copcu et al. mention that the pectoralis major flap is widely used in head and neck reconstruction, with the disadvantages of being very bulky and not matching the skin tone. (9). Moore et al. performed a combination of the pectoralis major flap with a cervicopectoral rotation flap to provide supplementary protection in radical neck dissections. (17).

Regarding the dissection plane, Delay et al. reported having performed it below the SMAS for greater blood supply and thickness (19). However, Kaplan and Goldwyn performed it above the SMAS to avoid injuring the marginal branch of the facial nerve (20). Liu et al. used the temporal flap in 2 patients to fill dead space in orbital exenterations and then rotated the cervicofacial flap above, avoiding dead spaces (13).

Lim et al. reported that the incidence of complications in the cervicofacial flap was 7.1% (21). Another complication mentioned is the alteration of blood flow in parts of the skin of the preauricular region (13,22).

CONCLUSION

The cervicofacial/pectoralis flap is a versatile flap and is an excellent alternative, providing an excellent combination of colour, thickness, and skin texture in the reconstruction of the midface. Both should be considered by surgeons, since their versatility, apart from reconstruction, includes being able to perform cervical dissection through the same approach and being able to combine other surgical techniques such as rotation of the temporalis or pectoralis major muscle flap.

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