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Case Report

Modified Mustardé-type cervicofacial flap for reconstruction of a zygomatic–maxillary defect secondary to squamous cell carcinoma: a case report

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ABSTRACT

Cutaneous squamous cell carcinoma (cSCC) is one of the most frequent malignant skin neoplasms and represents a therapeutic challenge in anatomically exposed regions. It is characterized by its invasive and metastatic potential, with predilection for the head and neck, particularly in elderly men with chronic sun exposure. In Mexico, it ranks second among skin cancers in prevalence. A 93-year-old male patient presented with a squamous cell carcinoma located in the right maxillary region. Complete oncologic resection with tumor-free margins was performed, followed by reconstruction using a cervicofacial rotation flap of the Mustardé type and lymph node dissection at levels IB and IIA. The postoperative course was favorable, with no local or systemic complications. At follow-up, the flap showed good perfusion and a well-healed aesthetic scar, with preserved facial symmetry and no signs of necrosis or lower eyelid retraction. The Mustardé-type cervicofacial flap provides a safe and versatile option for the reconstruction of extensive oncologic facial defects. Its wide arc of rotation, reliable vascular supply, and excellent color and texture match allow for satisfactory functional and cosmetic results. In this case, deep anchorage to the malar periosteum and zygomaticus central fascia provided stability and reduced traction on the lower eyelid. The Mustardé-type cervicofacial flap remains an effective reconstructive option for significant facial skin defects secondary to oncologic resections, achieving favorable functional and aesthetic outcomes, particularly in elderly patients.

Keywords: Mustardé flap, Oncologic surgery, Squamous cell carcinoma, Rotation flap, Cervicofacial flap

INTRODUCTION

One of the main challenges faced by oncologic surgery units is the management of tumors located in anatomically complex areas, where both functional and aesthetic restoration are priority objectives. These regions, due to their dense network of neural and vascular structures, require a surgical approach that combines oncologic clearance with preservation of facial function and appearance.[1-3]

Cutaneous squamous cell carcinoma (cSCC), also known as epidermoid carcinoma, is a malignant neoplasm originating from suprabasal epidermal cells or their appendages. Clinically, it may present as an *in situ*, superficial, infiltrative, vegetative, verrucous, or ulcerated lesion, with predilection for the head and extremities, and the potential to metastasize to regional lymph nodes or distant organs.[4,6]

According to international reports from GLOBOCAN and the Cancer Incidence in Five Continents series by the IARC, squamous cell carcinoma represents the seventh most frequent oncologic diagnosis worldwide, with approximately 890,000 new cases and 450,000 deaths annually—equivalent to 4.5% of all cancer diagnoses.[7] In Mexico, skin cancer ranks second in prevalence, accounting for nearly 13% of all oncologic cases, of which 17–23% correspond to cSCC.[1,6,8]

The main risk factor is chronic ultraviolet exposure; however, cSCC is also associated with immunosuppression (HIV infection or post-transplant therapy), human papillomavirus infection—particularly genotype 16—occupational exposure to chemical carcinogens such as arsenic and tar, as well as alcohol consumption, smoking, and ionizing radiation.[1,6,8] The classic phenotype includes fair-skinned individuals with light eyes and hair, predominantly males in a 2:1 ratio, typically between the fifth and seventh decades of life, with a history of prolonged sun exposure.[4]

The clinical course depends on the tumor's location and histologic characteristics. Lesions located in mucocutaneous or chronically inflamed areas have a higher metastatic risk, whereas those arising in photo-exposed regions tend to have a better prognosis.[4] Diagnosis is clinical and histopathologic, based on recognition of suspicious lesions and biopsy confirmation.

For proper staging, high-risk carcinomas are defined as tumors >2 cm in diameter with ill-defined borders or rapid growth, while very high-risk lesions exceed 4 cm, demonstrate deep invasion (>6 mm), are a desmoplastic subtype, or exhibit lymphovascular invasion.[9]

First-line treatment for *in situ* carcinoma is surgical excision or Mohs micrographic surgery. Low-risk invasive lesions require resection with 4–6 mm margins, whereas high-risk tumors demand 6–10 mm margins to ensure tumor-free borders. Alternatively, less invasive modalities such as cryotherapy or topical agents (imiquimod or fluorouracil) may be considered in selected cases.[2,9]

In facial regions, the choice of reconstructive technique depends on the location and extent of the defect as well as the patient's functional and aesthetic expectations. For cheek defects, advancement, cervicofacial rotation, or rhomboid transposition flaps—following the Limberg technique for tension-free closure—are frequently used.[3,9] In this context, the Mustardé-type cervicofacial flap, first described in 1964, remains a versatile, safe, and aesthetically favorable option, offering excellent color and texture match, reliable vascularity, and a low complication rate. Moreover, its scars blend naturally with facial expression lines, allowing optimal cosmetic and functional results even in elderly patients.[5,9]

This case report describes the surgical management of a cheek squamous cell carcinoma using the Mustardé-type cervicofacial flap, emphasizing the importance of an integrated oncologic approach that combines functional and aesthetic reconstruction in geriatric patients.

CASE REPORT

A 93-year-old male with no significant medical history presented to the oncologic surgery service with a preoperative diagnosis of squamous cell carcinoma in the right maxillary region. The patient was scheduled for tumor resection with lymph node dissection at levels IB and IIA, followed by defect reconstruction using a Mustardé-type cervicofacial skin flap.

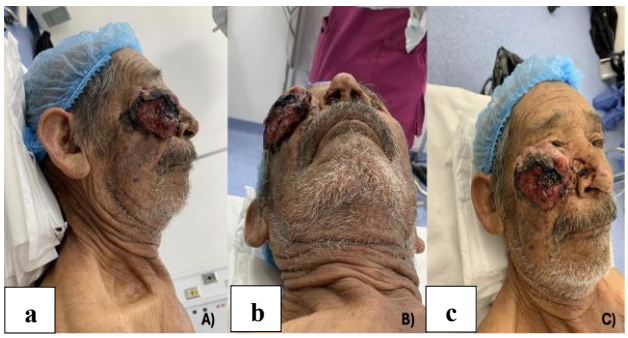

Figure 1: Preoperative appearance of the squamous cell carcinoma located in the right zygomatic–maxillary region, (a) lateral view showing tumor extension toward the infraorbital margin, (b) superior view demonstrating cutaneous infiltration and involvement of the midfacial region, and (c) inferior view illustrating tumor protrusion and its relationship with the lower eyelid and nasolabial fold.

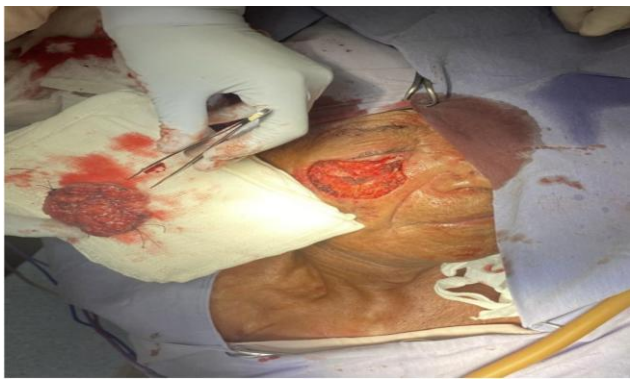

Figure 2: Oncologic resection of the squamous cell carcinoma located in the right zygomatic-maxillary region.

Patient preparation and surgical field

Under balanced general anesthesia, the patient was positioned supine with slight neck hyperextension and leftward rotation. After antisepsis and sterile draping, local anesthetic infiltration was performed at the flap site, followed by preoperative tumor marking and design of the Mustardé flap.

Oncologic resection

Tumor resection involved the right zygomatic arch region, measuring approximately 8×5×3 cm. Hemostasis was achieved with electrocautery, and the lesion was excised with safe oncologic margins, following the direction of platysma fibers inferiorly. Margins were marked with reference sutures and sent for histopathologic analysis to confirm tumor-free borders.

Flap design

The flap was outlined in a curvilinear fashion using the following landmarks - superior border: lower eyelid, medial border: nasolabial fold, and lateral border: preauricular region.

The incision extended caudally along the natural curvature of the cheek toward the anterior aspect of the ipsilateral sternocleidomastoid muscle insertion, allowing wide cervicofacial rotation by exploiting skin laxity in the zygomatic-maxillary and preauricular areas.

Flap dissection

Dissection was performed in the subcutaneous plane with Metzenbaum scissors, maintaining depth just beneath the dermis to preserve vascularity and prevent injury to facial nerve branches. Continuous hemostasis was ensured. The flap was progressively released laterally and caudally, maintaining the vascular pedicle and avoiding excessive tension on the lower eyelid margin.

Flap rotation and fixation

After elevation, the flap was rotated superomedially to cover the defect. The pivot point was located slightly lateral to the nasolabial fold. Subcutaneous anchoring sutures (Vicryl 5-0) were placed to the malar periosteum and zygomaticus central fascia to provide stability and reduce traction on the lower eyelid. Skin closure was performed with simple nylon 5-0 sutures along relaxed skin tension lines to optimize the aesthetic outcome.

Figure 3: Fully dissected Mustardé-type cervicofacial flap.

Redundant areas were trimmed with a Beaver blade to achieve a uniform thickness of 0.5–0.8 mm, resulting in a more natural contour. Subdermal absorbable sutures (5-0) ensured a tension-free closure. Adequate perfusion and flap mobility were confirmed before applying sterile dressings.

Intraoperative considerations and postoperative course

Strict hemostatic control was maintained throughout the procedure. No routine antibiotic prophylaxis was used. The patient was transferred to recovery for immediate flap perfusion monitoring. Postoperatively, the flap demonstrated good vascularity with no evidence of necrosis, dehiscence, or infection. At 30 days, the scar was aesthetically acceptable, with preserved facial symmetry and lower eyelid mobility. No ectropion or retraction was observed. Histopathology confirmed negative surgical margins. At the three-month follow-up, there were no signs of local recurrence or functional impairment.

Figure 4: Immediate postoperative result of the Mustardé-type cervicofacial flap.

DISCUSSION

Cutaneous squamous cell carcinoma is one of the most common malignant skin tumors and presents a therapeutic challenge when involving anatomically exposed regions such as the face. Oncologic resection with tumor-free margins remains the treatment of choice, but it often creates defects that compromise both facial function and aesthetics, particularly in the zygomatic-maxillary region, where vital muscular, neural, and vascular structures converge.[4,5]

Among the various reconstructive techniques described, the Mustardé rotation flap remains a versatile, safe, and aesthetically favorable option. Since its original description in 1964, it has been widely used for reconstruction of cheek, periorbital, and lower eyelid defects.[5] Its design allows wide cervicofacial rotation with minimal tension and excellent color and texture match, leading to satisfactory functional and cosmetic outcomes.

In our clinical case, we adapted the Mustardé flap to the patient's specific anatomic and oncologic characteristics. Unlike the conventional design—typically indicated for lower eyelid or mid-malar defects—the flap was extended cervicofacially to cover a larger defect in the right zygomatic-maxillary area. Dissection was carried out in the superficial subcutaneous plane, immediately beneath the dermis, to preserve cutaneous vascularization and prevent injury to facial nerve branches, which is especially relevant in elderly patients. The rotation point, slightly lateral to the nasolabial fold, provided a more medial and natural arc of rotation, optimizing the three-dimensional adaptation of the flap. Deep anchorage to the malar periosteum and zygomaticus major fascia added stability and minimized lower eyelid traction. These modifications, together with controlled flap thinning and the omission of routine antibiotic prophylaxis, optimized surgical safety, tissue perfusion, and the final aesthetic result in oncologic facial reconstruction for elderly patients.

The most common complications described for the Mustardé flap include partial necrosis, dehiscence, and ectropion; however, the incidence is low when the dissection plane is respected and facial nerve branches are preserved. The absence of complications and the satisfactory adaptation of the flap in this patient confirm the effectiveness of the technique, particularly in older individuals whose skin laxity facilitates tension-free closure and improved cosmetic outcomes.

CONCLUSION

The Mustarde-type cervicofacial flap is an effective technique for reconstructing significant maxillary defects following oncologic resections. In this case, modifications tailored to the geriatric patient's condition—leveraging skin laxity to achieve a tension-free closure—resulted in optimal functional and aesthetic outcomes without compromising flap viability. Careful dissection in subcutaneous planes respecting the course of neural branches preserved cutaneous sensitivity and motor function, reinforcing the value of this technique as a safe and versatile option for extensive facial reconstructions.

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