

TECHNICAL NOTE

Reconstructive considerations in the treatment of soft tissue sarcomas of the cheek

Considerazioni sulle tecniche ricostruttive nel trattamento dei sarcomi dei tessuti molli della guancia

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SUMMARY

Soft tissue sarcomas of the head and neck region are rare, and very little has been described about the reconstructive methods used after sarcoma resection of cheek soft tissue sarcomas. Reconstructive methods for cheek defects after sarcoma resection are presented and the possibilities, advantages, disadvantages, and expected results are described. A series of 3 patients with cheek soft tissue sarcomas were examined. Reconstructive methods included; one skin graft, a free forearm flap and a cervicofacial flap. All patients had lesions < 5 cm and low-grade tumours, and no case presented local recurrence or metastases. The choice of reconstructive methods depends mostly on the complexity of the defect. In cases comprising comparatively small or minor defects, reconstructions using local flaps, such as the cervicofacial flap, provide better aesthetic and functional results than either free flaps or skin graft.

KEY WORDS: Cheek • Soft tissue sarcoma • Surgical treatment • Cervicofacial flap

RIASSUNTO

I sarcomi dei tessuti molli della regione testa e collo sono rari, e molto poco è stato riportato sulle tecniche ricostruttive dopo resezione dei sarcomi della guancia. In questo studio riportiamo i metodi di ricostruzione per i difetti della guancia dopo resezione di sarcomi, prendendo in considerazione i vantaggi, gli svantaggi e i risultati attesi con le diverse metodiche. Abbiamo studiato 3 pazienti affetti da sarcoma della guancia. I metodi ricostruttivi utilizzati sono stati: un lembo cutaneo, un lembo libero di avambraccio e un lembo cervico-facciale. Tutti i pazienti presentavano tumori di dimensioni inferiori a 5 cm e a basso grado, nessun caso ha presentato recidive locali o metastasi. La scelta della tecnica ricostruttiva dipende principalmente dalla complessità del difetto. Nei casi di difetti minimi è possibile utilizzare il lembo cervico-facciale che permette di ottenere ottimi risultati estetici e funzionali.

PAROLE CHIAVE: Guancia • Sarcomi dei tessuti molli • Terapia chirurgica • Lembo cervico-facciale

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Introduction

Soft tissue sarcomas (STSs) arising on the head and neck region are relatively rare and account for less than 10% of all STSs^{1,2} and less than 1% of all primary neoplasms of this region^{3,4}. The management of STS is primarily surgical. Neither adjuvant irradiation nor chemotherapy alone has been proven effective⁵. Post-operative radiation therapy is recommended for surgically difficult-to-treat or unresectable lesions and in cases with close or positive margins^{1,2}. The success of the surgical operation, in terms of local control, aims for wide surgical excision in the attempt to obtain surgical margins free of microscopic tumour^{1,2}. Adequate excision margins are generally approximately 2.5 to 3 cm from the edge of the tumour including the underlying deep fascia⁴. However, the same definitions of adequate margins cannot, obviously, be held relevant for head and neck sarcomas as for other locations

because of the anatomic constraints, and the requirements for functional and cosmetic outcome. In the head and neck region, the importance of obtaining wide tumour-free margins has particularly increased the complexity of operations and the importance of soft-tissue reconstruction. In this article, personal experience with reconstructive methods is reported in patients with oncological defects affecting the cheek.

Materials and methods

Herewith, three types of reconstructive methods are described.

The size of the tumour was obtained from the measurement of the resected specimen. The depth was based on anatomical location as determined by pre-operative imaging, with "superficial" referring to sarcomas arising within the skin and subcutaneous tissues, and "deep" referring to

involvement deep within the fascia. Tumours were graded 1 to 3 using the French *Fédération Nationale des Centres de Lutte Contre le Cancer* grading system, taking into account tumour differentiation, mitotic count and extent of tumour necrosis⁶. The clinical staging used was derived from the American Joint Committee on Cancer System for soft-tissue sarcomas⁷.

Case 1: Reconstruction using a skin graft

A 39-year-old male presented with a mass involving the right cheek (Fig. 1a). An incisional biopsy revealed a leiomyosarcoma. T2-weighted, enhanced magnetic resonance imaging (MRI) showed a focal high-signal mass highlighting the involved tissues, including the subcutaneous tissue and right masseter muscle. At surgery, the patient underwent wide excision, leaving a 9 × 7 cm defect. Histological diagnosis was leiomyosarcoma with tumour-free surgical margins (grade 2, stage IA). A lateral arm free flap was used to reconstruct the cheek defect. Unfortunately, arterial and venous thrombosis occurred 48 hours after the operation. The surface was skin grafted using split thickness skin from the abdomen. The patient had an uneventful post-operative recovery period and did not require adjuvant therapy. He has remained disease-free at 15 years' follow-up (Fig. 1b).

Case 2: Reconstruction using a free radial forearm flap

A 44-year-old male with a leiomyosarcoma of the right cheek underwent inadequate wide excision at another clinic, leaving a 2 cm scar (Fig. 2a). After excision of the scar tissue, reconstruction was performed using a radial forearm flap. After raising the skin island, the donor site was skin grafted. The flap was transferred; the radial artery and one comitant vein were anastomosed to the facial artery and external jugular vein (Fig. 2b). Histological

diagnosis was leiomyosarcoma with tumour-free surgical margins (grade 2, stage IA). The patient had an uneventful post-operative recovery period and did not require adjuvant therapy. He has remained disease-free at 10 years' follow-up (Fig. 2c).

Case 3: Reconstruction using a cervicofacial flap

A 45-year-old male presented with a myxofibrosarcoma on the left cheek (Fig. 3a). T2-weighted, enhanced MRI showed focal high-signal mass of the involved tissues, including the subcutaneous tissue and close to left masseter muscle. The patient underwent wide excision. The histological diagnosis was myxofibrosarcoma with tumour-free surgical margins (grade 1, stage IA). The defect was reconstructed with a subcutaneous cervicofacial flap (Fig. 3a). After a wide resection undermining tissues including the cheek, neck, and retro auricular regions above the plane of the superficial musculo-aponeurotic system (SMAS), the cervical part of the flap advanced upwards. The part of the flap corresponding to the cheek rotated forward. The point corresponding to the earlobe went upward and forward towards the outer canthus. The patient had an uneventful post-operative recovery period and did not require adjuvant therapy. Post-operative follow-up, at 24 months, showed no local recurrence and the aesthetic result was considered very good both by the patient and surgeons (Fig. 3b).

Discussion

It is well known that patients presenting with head and neck sarcomas require early diagnosis, careful pre-operative assessment, and often an appropriate surgical operation^{1,8}. On the face, soft tissue coverage after ablative sarcoma resection remains a challenge for reconstructive

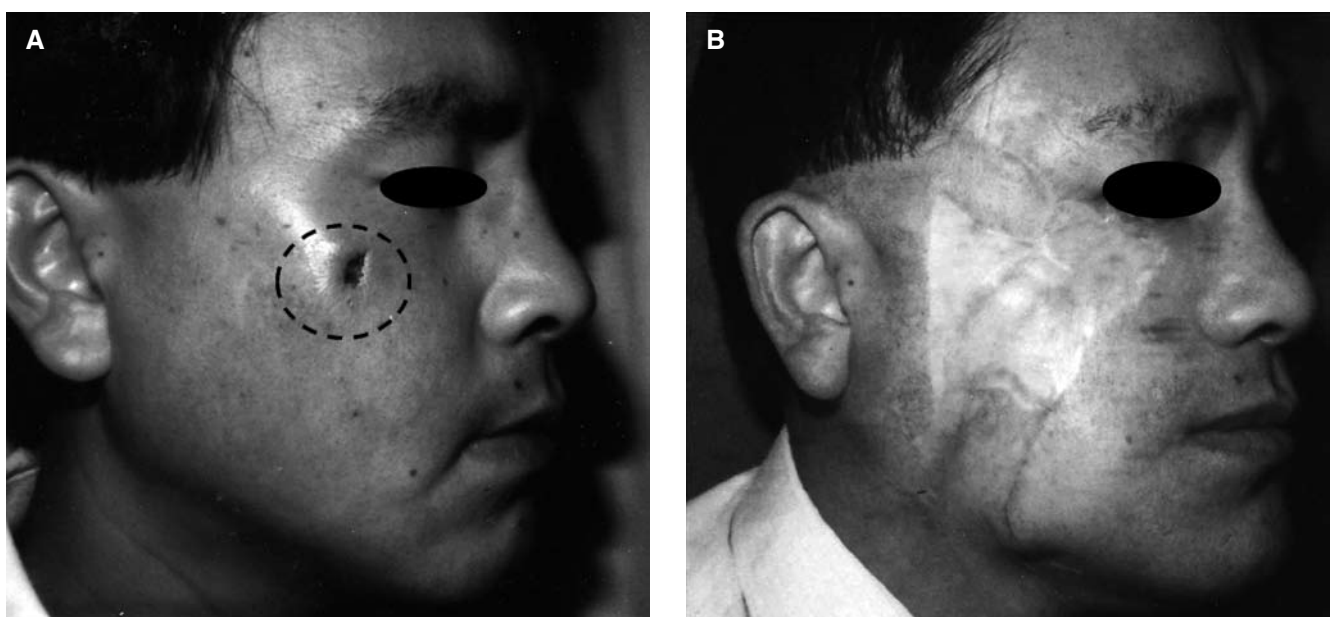


Fig. 1. Patient 1. A. Pre-operative appearance. The patient underwent an incisional biopsy at another clinic. B. Patient's appearance 10 years after tumour resection and reconstruction with a split-thickness skin graft.

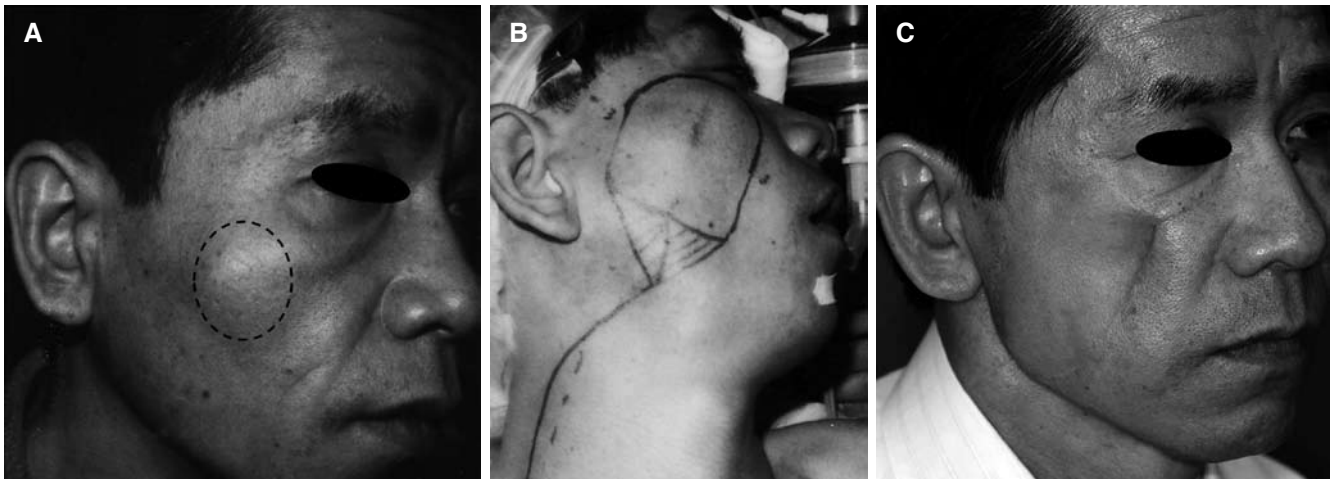


Fig. 2. Patient 2. A. Pre-operative appearance of leiomyosarcoma on right cheek. B. Design of flap. Tumour has been resected at another clinic. C. Patient's appearance 10 years after tumour resection and reconstruction with a radial forearm flap.



Fig. 3. Patient 3. A. Design of flap. A wide excision was performed with 15 mm surgical margin, and the defect was resurfaced using a cervicofacial flap. B. Patient's appearance 24 months after tumour resection and reconstruction.

surgeons as defects in this region often require complicated functional and cosmetic reconstruction. Conventional reconstructions involving this region have been achieved with primary closure, skin grafts, local flaps, distant pedicled flaps and free tissue transfer⁹⁻¹¹. Each of these methods has merits and drawbacks, and the choice mostly depends on the complexity of the defect, the patient's age, sex, condition, the timing of the reconstruction, donor site consideration, and the surgeon's preference.

Either full-thickness or split-thickness skin grafts are convenient and minimally invasive procedures when the defects are superficial, and can be useful especially in elderly patients with cardiovascular or other complications. However, colour mismatch, skin surface contour irregularity, and graft contracture are frequent complications of skin grafts.

The radial forearm flap has undergone numerous modifications for reconstruction of head and neck defects that require thin soft tissue, and several composite flaps based on the radial artery have been described^{12,13}. The flap pedicle length is likely the largest one that may be obtained from any free flap. Both the radial artery and cephalic vein have

a large diameter, which is important for anastomosis, and the concomitant veins may be reliably used for venous anastomosis. Due to these advantages, fasciocutaneous radial forearm flaps have a definite role for reconstruction of intra-oral defects, and cheek defects involving the inner lining, external skin, or both. Santamaria et al. describe the versatility and dependability of the radial forearm with various head and neck defects using different types of free flaps harvested from the radial forearm¹². The antero-lateral thigh flap has become one of the most commonly used flaps also for head and neck reconstruction^{14,15}. The advantages of this flap include a large volume of soft tissue availability, a long vascular pedicle, and minimal donor-site morbidity. However, it is more bulky in reconstruction for cutaneous and soft-tissue defects of the face, and has hair follicles in male patients. The disadvantages of these free flaps include microvascular complications, and poor contour and colour mismatches compared to local or regional flaps. Yamamoto evaluated colour match between the face and transferred flaps, and demonstrated that facial reconstruction using free flaps harvested from trunk skin gave significantly better colour-matched results than that from the upper and lower extremities¹⁶. Although the delto-pectoral flap probably has the best colour match, the vascular pedicle is small and short, and microsurgery procedures to transplant this area are difficult¹⁶. Adherence to aesthetic subunit principles can minimize the mismatches resulting from using free flaps.

The cervicofacial flap is an effective method for cheek alone, or cheek and eyelid reconstruction, and facial reconstruction. In 1979, Juri and Juri reported the use of a cervicofacial flap for cheek repairs¹⁷. They mentioned that the flap unfolds into two flaps, one flap advances upwards and another flap rotates forwards, to supply a larger amount of tissue, and does not need a skin graft to the donor site or leave objectionable scars. This method offers advantages in simplifying often complicated facial procedures. The closure scars are put in the least noticeable areas. The main disadvantage of this flap is its unreliable

distal ischaemia, which may lead to distal necrosis, in particular when the flap is sutured under tension because of the extension of the defect or when the patient has unfavourable microcirculatory disease. Delay et al. developed composite cervicofacial flaps include SMAS and platysma to reduce the possibility of distal ischaemia and to expand the options of this flap¹⁸. This composite flap is more mobile, more reliable, thicker, and more adaptable compared to the classic subcutaneous flap. However, there is the risk of injury to facial nerve branches.

Flap choice was based on numerous clinical factors. However, anatomical location of the defect is a key determinant of possible reconstructive options. For facial reconstruction, important factors including colour, texture, and thickness should be comparable with the excised skin. Sekido et al. investigated reconstructive methods retrospectively related to the site and size of malignant melanomas resected from the head and neck, and reported that reconstruction with local flaps gave better aesthetic and functional results than free flaps and skin grafts¹⁹. Local tissue flaps are good options because

of their ability to incorporate similar skin types in the repair processes. In conclusion, the subcutaneous cervicofacial flap is a flap commonly used for partial repairs of the cheek. The marked advantage of this flap is the possibility to place the scar lines at the limit of the aesthetic units of the face¹⁸, whereas free flaps make the heterogeneous surfaces at the transferred area. However, lack of local tissue availability in larger defects requires movement of distant tissue to the site. Despite the typical colour mismatch of the transferred skin flap, thin and pliable flaps, like the radial forearm flap, allow for contouring to the facial skeleton.

There is reliable evidence that tumour-free surgical margins are critical for local control and overall survival^{1,20}. There were no cases of local recurrence within our patient group, because all sarcomas were relatively small and presented with low grade and stage IA. Sarcomas of the cheek have been shown to be smaller at presentation, presumably because of their aesthetic significance. This may have had a significant impact on the operation success rates, reflected in a better metastasis-free survival.

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