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Vertical Trapezius Myocutaneous Flap for Post Electrical Burn Defect of the Scapular Region - A Case Report

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Abstract

Reconstruction of soft tissue defects around the posterior upper trunk and cervico-thoracic spinal regions is a difficult problem to the reconstructive surgeon. The trapezius muscle and myocutaneous flap is a versatile flap allowing for reconstruction of multiple head and neck surgical defects. The trapezius flap is harvested based on the dorsal scapular artery or on the superficial cervical artery based on the orientation of the flap desired and the length of pedicle necessary. Variations in the vascular anatomy of the trapezius muscle flap are uncommon, but when present, such variations appear to have little impact on harvesting the flap or on its circulation. The use of the trapezius myocutaneous flap is safe and well tolerated option for the reconstruction of complex soft tissue defects of the lateral and posterior cervical regions, side of the head, shoulder, and upper paravertebral and parascapular regions with minimal donor site morbidity.

Keywords: *Trapezius flap; myocutaneous flap; Scapular defect; Aesthetic outcome*

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I. Introduction

Wound complications following spinal and cranial surgeries are rare but, factors such as surgical site infection, skin infiltration with tumour, and radiotherapy may lead to the destruction of local tissue and wound gaping. (1) However Local flap tissue is often inadequate to fill the three-dimensional soft tissue defects. Trapezius myocutaneous or muscle-only flap is an excellent regional option for resurfacing soft tissue defects over the cervico-occipital and complex posterior scalp regions. Nakajima and Fujino in 1984 first described the trapezius flap. (2) It was originally described as a myocutaneous or muscle flap, and it has also been used as a skin flap and free flap. (3,4) The trapezius myocutaneous flap is used in various salvage procedures for head and neck reconstruction, especially in cases where previous radiotherapy and repeated surgical procedures limit the use of free flaps. (5) The trapezius flap is a suitable alternative with a shorter operation time and minimal functional deficits, providing a robust vascular supply reducing the risk of infection. The trapezius muscle has a type II vascular pattern, with dominant and minor vascular pedicles according to the Mathes and Nahai classification. (6) The dominant vascular pedicle of the flap is derived from the transverse cervical artery (TCA). (7) A descending branch of the TCA has been reported as a major vessel that ascends to the levator scapulae and rhomboid muscle to reach the trapezius. (8) In 1991, Netterville and Wood in 1991 reported that the dorsal scapular artery (DSA) was the dominant pedicle of the trapezius muscle based on their dissection of 15 cadavers. (9) But there is an ongoing discussion whether the dominant vessel is a deep branch of the TCA. (10)

II. Case Report

45 year old gentleman came to us with an alleged history of work place injury caused by electric burns.There is no history of loss of consciousness, vomiting, ENT bleeding or seizures. He is a known hypertensive since 5 years on regular medications. On examination, there is a second degree deep burns measuring about 8 x 7 cm in the left upper back region. There is also second degree deep burns of the right arm, elbow, lateral aspect of right leg and right gluteal regions. **(Fig. 1)** There was no spinal tenderness, fractures and the pelvic compression test was negative. A diagnosis of 32% TBSA second degree deep burns was made. After obtaining all necessary clearances, the patient was admitted in ICU for observation. Once he was stable, the wounds were debrided and negative pressure wound therapy was applied. He had a residual defect in the left upper scapular region for which we planned a left vertical trapezius myocutaneous flap. Under general anaesthesia, thorough debridement was done, the defect size was 13 x 8cm with exposed spine of scapula. Planning in reverse was done for left vertical trapezius myocutaneous flap. Markings were done accordingly and incisions were deepened. **(Fig. 2)** The myocutaneous flap was elevated above the level rhomboidus major and transposed to the defect. **(Fig. 3)** Inset was given with 2-0 nylon and the secondary defect was closed primarily. The post-operative period was uneventful and the flap settled well. **(Fig. 4)**

Fig. 1 – Picture showing the defect

Fig. 2 – Vertical trapezius myocutaneous flap incised

Fig. 3 – Flap elevated

Fig. 4 – Post-operative picture showing well settled flap

III. Discussion

Conley in 1972 was the first to describe and publish the trapezius muscle flap, based on perforating veins of the paraspinal muscle derived from posterior intercostal vessels. (11) McCraw et al., in 1977, used an upper trapezius flap for reconstruction of neck defects and Demergasso and Piazza in 1979 for reconstruction of the hypopharynx. (12,13) Baek in 1980 described an operative technique for harvest of a lower trapezius myocutaneous flap for reconstruction of parotidectomy defects. (14) The trapezius muscle is divided into three parts: upper, middle, and lower. Its blood supply is derived from the transverse cervical, occipital, dorsal scapular, and perforating vessels from the posterior intercostal vessels. The motor innervation is from the spinal accessory nerve. The trapezius muscle participates in the elevation, retraction, and rotation of the scapula, in addition to allowing the elevation of the shoulder during the abduction and flexion of the arm. Its denervation results in a drop of the shoulder.(16-20) The dominant blood supply of the trapezius muscle and overlying skin, considering, is by the superficial cervical artery (SCA) and deep branches, dorsal scapular artery (DSA) of the TCA; the TCA generally arises from the thyrocervical trunk. (21) The anatomy of the TCA in the posterior triangle is highly variable. (21,22) The TCA enters the trapezius muscle at the base of the neck and descends vertically along the deep surface of the muscle. It arises directly from the subclavian artery in most people and extends across the posterior triangle of the neck where it divides into the SCA, which crosses over the levator scapulae, and a deep branch, which runs deep to the levator scapulae. (21) The SCA gives rise to a descending branch and an ascending branch which can be used individually when raising a trapezius muscle flap. Minor pedicles arising from the occipital artery, circumflex scapular artery, and intercostal perforators are uncommonly used for trapezius flaps. The SCA runs lateral and superficial to the levator scapulae and rhomboid muscles and is accompanied by branches of the accessory nerve. (23) Its course lies beneath the anterior border of the trapezius muscle. The trapezius muscle flap is designed along the course of the SCA. Thus, the long axis of the flap is centred between the spine and the medial border of the scapula. The medial border of the flap is marked 1.5 cm lateral to the spinous processes, and the width of the flap is generally 6–9 cm. The pivot point of the flap is positioned at the level of the scapular spine to preserve the superior portion of the trapezius muscle. The distance between the pivot point and defect determines the pedicle length.

The trapezius flap is multipurpose, versatile, practical, and reliable option for head and neck reconstruction varying from a muscle-only flap to a perforator-based skin flap, and can even be used as a bilateral flap or an osteomusculocutaneous trapezius flap. (24) Trapezius muscle flaps are similar to local flaps in terms of easier surgical technique, better colour and texture match with the surrounding tissue and a reduced surgery time. The trapezius flap can rotate in a wide arc to reach defects in the occiput, nuchal, or spinal areas, and it is thinner and more pliable than the latissimus dorsi and pectoralis major flaps. (5) The donor site can usually be closed directly, and donor site-associated morbidity is minimal as the donor site scar is in the posterior trunk, which is concealed under clothes. Functional impairment does not occur if the upper part of the trapezius muscle and rhomboid muscles containing the spinal accessory nerve are preserved. The main disadvantage of the trapezius muscle flap is its limited width, which is restricted to a maximum of 8–10 cm. Hence, the dissection of the lower trapezius myocutaneous pedicle flap is based on two vascular pedicles, the superficial cervical and dorsal scapular vessels, allowed achieving a great vascularization of the flap, avoiding partial loss or necrosis, without any difficulty with their rotation toward the cervical and thoracic regions. Thus, the trapezius muscle flap is a good choice for posterior neck and scalp reconstruction.

IV. Conclusion

The trapezius flap is a reliable and versatile flap for coverage of complex cervical-occipital and upper thoracic soft tissue defects. Based on the vascular anatomy, we can harvest with a long pedicle and a wide arc of rotation with minimal morbidity.

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