



The lower trapezius island myocutaneous flap in tunnelled technique to cover complicated tissue defects located between the craniocervical and cervicothoracic junction following spinal surgery



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ABSTRACT

Purpose: Stable coverage of complicated defects located between the craniocervical and cervicothoracic junction following wound healing disturbance after spinal surgery can be challenging. Especially in cases where devices are exposed, well-vascularized coverage is required to achieve stable wound conditions. Therefore, the aim of the present study was to evaluate the clinical outcome of the lower trapezius island myocutaneous flap (LTIMF) as a possible treatment option.

Materials and methods: Four patients with a mean age of 68.8 years (ranging from 50 to 93 years) with wound healing disturbance following spinal surgery leading to defects of the dorsal neck/upper back refractory to conservative treatment and surgical debridement were included. All defects were reconstructed with a LTIMF based on the transverse cervical artery.

Results: Mean follow-up was 16.5 months (ranging from 5 to 30 months). No major flap failure occurred; minor complications in three patients including lateral superficial skin necrosis were easily handled. In all patients, excellent functional and aesthetic results were achieved.

Conclusion: The lower trapezius island myocutaneous flap represents a reliable treatment option to cover complicated defects located between the craniocervical and cervicothoracic junction following wound disturbance after spinal surgery.

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1. Introduction

According to the current literature, the numbers of surgical treatments for spinal disorders has increased over the last few decades (Veeravagu et al., 2015). Wound-related complications are relatively common. The complication rates vary, depending on patient-specific factors such as disorders (Pull ter Gunne and Cohen, 2009) as well as the surgical approach and numbers of operated spinal levels (Veeravagu et al., 2015). The management of wound infection and/or dehiscence following spinal surgery can be

challenging, especially in the case of an exposed stabilization device. Surgical wound debridement, device removal, and antibiotic treatment may lead to symptom-free status but are often time-consuming and expensive. Therefore stable coverage with well-vascularized musculocutaneous flaps is necessary to guarantee stable wound conditions (Hochberg et al., 1998) in an increasing number of patients. In spite of the advanced microvascular reconstruction techniques available nowadays, pedicled flaps including the trapezius flap represent a reliable procedure to cover tissue defects with excellent functional and aesthetic outcomes. Four different types of trapezius flaps have been described, including the lower trapezius island myocutaneous flap (LTIMF) (Can et al., 2014). The LTIMF has been successfully used for many different indications in reconstructive surgery at different anatomical sites including skin defects on the back or oral defects after ablative surgery (Can et al., 2014; Chen et al., 2009, 2011; Fang et al., 2014; Stillaert and

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Van Landuyt, 2009). The LTIMF is easy to harvest, allows a wide range of rotation, and offers a secure vascularization. However, only a few studies give detailed information on the reconstruction of tissue defects located between the craniocervical and cervicothoracic junction following spinal surgery (Can et al., 2014; Stillaert and Van Landuyt, 2009). Therefore, the aim of this study was to evaluate the clinical outcome of the lower trapezius island myocutaneous flap to reconstruct these defects.

2. Materials and methods

2.1. Ethics approval

The Ethics Committee of the Faculty of Medicine Charité Berlin approved this study.

2.2. Patients

The present study is a review of four patients (three males and one female) with wound healing disturbances after spinal surgery leading to defects between the craniocervical and cervicothoracic junction refractory to conservative treatment and surgical debridement. Dorsal stabilization had been performed due to spinal canal stenosis, chronic pain, paravertebral resection of metastasis, and rheumatoid arthritis. All patients were treated with a lower trapezius island myocutaneous flap at the Department of Oral Maxillofacial Surgery, Campus Virchow-Klinikum, Charité–Universitätsmedizin Berlin in cooperation with the Department of Neurosurgery between June 2012 and January 2015. The mean patient age was 68.8 years, ranging from 50 to 93 years. The medical records of these patients were reviewed retrospectively. Photographs were taken during the last follow-up visit.

2.3. Surgical technique

All cases were reconstructed with a lower trapezius island myocutaneous flap based on the transverse cervical artery (TCA). The course of these main blood vessels is located typically between the vertebral column and the medial border of the scapula. In preparation for the surgical intervention, depiction using the Doppler technique can be helpful. The patients were placed in the prone position. Debridement of the wound edges of the defect was performed, and stabilization devices were disinfected or exchanged in case of doubt. After definition of the extent of the defect, major landmarks for the pedicle and incision lines for the lower trapezius island flap were marked. The caudal end of the flap may exceed the caudal border of the trapezius muscle.

The flap should be circumcised in the caudal region of the trapezius muscle starting medial about 2 cm next to the vertebral column. The skin and subcutaneous tissue are incised along the island margins, and the trapezius muscle is easily identified and cut. Care should be taken to visualize the deep fascia on the undersurface of the muscle containing the TCA. After identifying the vessels, the flap is completely circumcised, and the skin is sewn to the deep fascia to avoid any sheering (Fig. 1a). In the case of tunnelled technique as described here, the overlying subcutaneous tissue has to be divided first and should be retracted by (illuminated) hooks (Fig. 1b). The advancement of the pedicle starts medial to the trapezius muscle beside the vertebral column including the deep fascia and should be performed stepwise under visualization of the TCA and the accompanying veins. If lengthening of the pedicle is necessary to cover defects above the upper border of the scapula, the dorsal scapular artery can be ligated, but the preparation should not exceed the scapula spine. The flap can then be easily tunnelled into the recipient defect. The donor site can be



Fig. 1. Clinical picture of the (subcutaneous) tunnel made for the flap shift of patient no. 2.

closed primarily after careful haemostasis, and a suction drainage is inserted before the defect is finally covered using the trapezius island flap (Fig. 1c).

2.3.1. Case 1

A 64-year-old man presented with wound healing disturbance following dorsal stabilization of the cervical spine (C3–C7) after laminectomy/decompression due to spinal canal stenosis. Conservative measures including antibiotic treatment and regular wound care, as well as surgical wound debridement under local anaesthesia, failed to achieve stable coverage over a period of 4 weeks. An undermining defect measuring 8 × 5 cm was visible. A left-sided LTIMF was used to cover the defect, leading to good aesthetic and functional results (Fig. 2.1).

2.3.2. Case 2

A 50-year-old man presented with wound healing disturbance following foraminotomy and dorsal stabilization (C3–T1). Over a period of 2 months, multiple surgical interventions as well as vacuum-assisted closure (VAC) therapy failed to achieve stable wound conditions. The dimensions of the defect were 10 × 8 cm. A left-sided LTIMF was used in the tunnelled technique, gaining secure coverage of the device and defect (Fig. 2.2).

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