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A technique for facial reanimation: The partial temporalis muscle-tendon transfer with a fascia lata sling[☆]

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KEYWORDS

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Summary *Background:* This report describes the results of a surgical procedure for facial reanimation. This single-stage technique involves the orthodromic transfer of only a superficial segment of the temporalis tendon. This is extended with fascia lata to achieve elevation of the oral commissure along the desired vector in the paralysed hemi-face.

Methods: A retrospective case note review was performed. Patients' photographs were objectively evaluated with Facial Assessment by Computer Evaluation (FACE) software.

Results: Thirty-nine patients underwent the procedure from 2001 to 2011. Median age at the operation was 57.0 years (interquartile range (IQR) 38.2–66.3 years), and median duration of follow-up was 0.9 years (IQR 0.5–1.8 years). All patients achieved early improvements in appearance and function after surgery. Three patients underwent further, minor procedures for aesthetic and functional adjustments around the oral commissure. Complications occurred in three patients: two minor facial haematomas and one thigh wound infection. The surgery did not disturb natural temporalis muscle function.

FACE analysis demonstrated that no significant movement of the oral commissure occurred during attempted smiling in the paralysed hemi-face before surgery. However, symmetry was achieved when the healthy and paralysed hemi-faces were compared post-operatively, both in repose and during controlled smiling.

[☆] Prior presentations: Part of this work has previously been presented at the British Association of Plastic, Reconstructive and Aesthetic Surgeons meeting, London, UK, 5th December 2012, at the Kenya Society of Plastic, Reconstructive and Aesthetic Surgery meeting, Nairobi, Kenya, 30th August 2013, at the Royal Society of Medicine session on Advances in Facial Reanimation, London, UK, 21st January 2015, and at the Controversies and Challenges in Head and Neck Cancer and Facial Palsy Conference, Chelmsford, UK, 6th November 2015.

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Conclusions: This modified, single-stage technique for facial reanimation improves commissure mobilisation and has been objectively shown to restore symmetry of the commissure to the reanimated hemi-face.

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Introduction

Longstanding facial paralysis remains a complex management challenge. No single technique currently allows the complete restoration of an immediate, spontaneous smile, normal speech, oral sphincter competence and satisfactory appearance in repose. Regional muscle transfer using orthodromic transfer of the temporalis tendon can be used to achieve dynamic reanimation of the oral commissure. The procedure offers dependable, early and controllable reanimation of the smile.

An invariable vector of movement relative to the Frankfort¹ and occlusal planes² is, however, created with the temporalis tendon transfer. This is worsened when the tendon is attached to only a single point around the mouth and when the temporalis is stretched, overcorrecting the paralysis.³ In the past, little effort has been made to augment the direction of pull of the temporalis to create a symmetrical smile. In addition, several studies have outlined the anatomical structures at risk during mobilisation of the temporalis tendon from the coronoid,^{2,4,5} and these techniques can disrupt the natural function of the temporalis.

This report describes a technique to reanimate the smile that attempts to address these shortfalls. The *partial* temporalis muscle-tendon transfer (pTTT) with a fascia lata sling was performed by the lead author from 2001 to 2011 in 39 patients. This study reports the long-term outcomes using this technique, including an objective evaluation of commissure excursion distance and smile symmetry.

Patients and methods

The study was registered with and approved by the centre's Clinical Effectiveness Department as a non-experimental, retrospective service evaluation of an existing practice. The work complied with relevant aspects of the Declaration of Helsinki. Each patient was offered the range of surgical reanimation options. All patients in this cohort chose to undergo the pTTT after providing full, informed consent. A case note review was performed.

Facial Assessment by Computer Evaluation (FACE) software demonstrates strong inter- and intra-observer agreement⁶ and was used by a single author (TEP) to objectively measure commissure location (the primary outcome) from patients' photographs as described in the work of others.^{7,8} Analysis of the normal and affected sides of the face, in repose and whilst smiling, pre- and post-operatively was performed. FACE yields four main measurements: lateral (horizontal) displacement of the oral commissure

(from the middle of the lower vermillion border), vertical displacement, the hypotenuse (total) displacement, and the angle of elevation of the commissure from the vertical plane. To ensure the accuracy of the FACE measurements, photographs were excluded from the analysis if the irises were not visible (distance is calibrated to the diameter of the iris), if the head was rotated, or if both eyes were not directed at the camera.

Preoperative preparation

Preoperatively, the vector of the smile on the normal hemiface and the effect of the smile on the shape of the upper lip are determined. The patient is asked to smile while the affected side is kept in a balanced position by counteracting the pull from the normal side using two fingers to stabilise the naso-labial line of the affected side. This manoeuvre helps to determine the points where the strips of the fascia lata are attached to produce a symmetrical smile and shape to the lips.

Surgical technique

Please see the video related to this article that demonstrates the technique in full and can be found at <http://dx.doi.org/10.1016/j.bjps.2016.10.011>.

A strip of fascia lata measuring 12 × 2.5 cm is harvested from the thigh on the same side as the facial palsy using a 10-cm long, longitudinal incision. A flipped L-shaped incision is made starting 3 cm above the zygoma, in the temple and down to the pre-auricular area (Figure 1). In women, the incision can follow a post-tragal line. A 2-cm incision is made in the nasolabial line just above the oral commissure, and another 1-cm incision is made just below the oral commissure in the natural crease to mimic the muscle pull on the normal side. An upper lip pocket is dissected down to the lip margin and two-thirds towards the philtrum. The lower lip pocket extends along the lip margin for the width of the incision close to the midline, where a 1-cm long incision is made along the lip margin to facilitate the plication of the fascial strip medially.

Subcutaneous dissection of the skin of the temple and the cheek is performed above the superficial temporal fascia (STF) and superficial musculo-aponeurotic system (SMAS) until the anterior margins of the parotid gland. From this point, two separate tunnels are dissected, one wider, about 2 cm, in the direction of the upper lip incision; and another, narrower, in the direction of the lower lip crease incision. These tunnels are dissected bluntly with scissors and deep to the cheek fat to produce a natural round cheek

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