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	作成者: Ueda, Kazuki, Kajikawa, Masayuki, Ookouchi,
	Masayuki, Tateshita, Tohru, Hirose, Tarou, Asai, Emiko,
	Sakaba, Takao
	メールアドレス:
	所属:
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How to Create a Natural Nasolabial Fold during Muscle Transplantation for the Treatment of Facial Paralysis

Kazuki Ueda, M.D.*; Akiyoshi Kajikawa M.D.; Masayuki Ookouchi, M.D.; Tohru

Tateshita, M.D. and Tarou Hirose, M.D., Emiko Asai, M.D., Hiromi Ookouchi, M.D. and Takao Sakaba, M.D.

Department of Plastic and Reconstructive Surgery

Fukushima Medical University

1 Hikarigaoka, Fukushima 960-1295, Japan

E-mail: uedakazu@fmu.ac.jp

Tel:+81-24-547-1355; Fax:+81-24-548-9700

* Corresponding author

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(Text)

Why is the nasolabial fold so clear when we transplant the muscle to the cheek in patients with incomplete facial paralysis? Our surgical approach is derived from this question. During muscle transplantation for patients with complete facial paralysis, it is difficult to create a clear nasolabial fold, even when considerable contractility of the grafted muscle is obtained. In cross-face nerve grafting, however, the nasolabial fold can be created easily at the normal position, although restored muscle contractility is always inadequate. This is because the normal anatomical structures around the nasolabial fold are not disturbed by this procedure. We attach great importance to this advantage, and therefore, we used cross-face nerve grafting to create a clear nasolabial fold for our patients in muscle transplantation. <u>However, cross-face nerve grafting</u> does not effect only in the early stage of paralysis and it may interfere with spontaneous recovery when it is uncertain if the facial nerve will recover. We attempted to overcome this dilemma by using only a small peripheral branch on the affected side in the initial cross-face nerve grafting.

PATIENTS AND METHODS

The four patients ,aged from 35 to 58 years, had all undergone resection of an acoustic tumor, which resulted in complete facial paralysis. The facial nerve was not cut, but the exact degree of facial nerve injury was unknown.

The first-stage operation was performed between 3 weeks and 2 months after the onset of paralysis. It was to perform nerve grafting with the sural nerve and to connect the <u>peripheral</u> zygomatic branch on the affected side with a zygomatic branch on the healthy side through a small skin incision on both cheeks. The sural nerve was placed

through the upper portion of the upper lip. The two most recent patients also underwent an end-to-side interpositional jump graft between the buccal branches and the hypoglossal nerve on the ipsilateral side using the sural nerve during the cross-face graft procedure¹.

In the second stage of the procedure, performed more than 2 years after the first operation, the latissimus dorsi muscle was transplanted with a long neural pedicle between the nasolabial fold and the zygomatic arch. The transplanted muscle was fixed to the orbicularis oculi muscle just at the nasolabial fold, not medially beyond the nasolabial fold (Fig 1). We believe that the insertion of the transplanted muscle medially into the upper lip may destroy the normal structure of the nasolabial fold and spoil the effect of the cross-face nerve grafting. The thoracodorsal nerve was passed through the lower portion of the upper lip to avoid the injury to the cross-face nerve and then sutured directly to the facial nerve branch on the healthy side. The muscle was vascularized by anastomosing the nutrient vessels with the facial vessels. The follow-up period is 1 year in two patients and 2 years in two patients.

RESULTS

The patients showed functional recovery of the facial muscles between 8 and 18 months after the first procedure (nerve grafting). Facial asymmetry remained, but the nasolabial fold had almost recovered its normal position.

After muscle transplantation, the initial contraction of the grafted muscle was seen between 6 and 8 months postoperatively. Finally, each

patient presented with a near-natural nasolabial fold and natural facial movement. Three patients were classified as grade 5, and one patient was classified as grade 4 according to the criteria proposed by Harii² (Fig. 2). In all patients any spontaneous recovery was not found in the course of follow-up period and the evoked potentials were recorded from both the transplanted muscle and the zygomatic major on the affected side by the electrostimulation of the facial nerve on the healthy side. <u>Any</u> <u>evoked potentials were not recorded from the facial muscles on the affected side by the</u> <u>electrostimulation of the ipsilateral facial nerve.</u>

DISCUSSION

In our two-stage procedure, the complete paralysis is converted initially to incomplete paralysis by the first operation, and the incomplete paralysis is improved by the second operation. Thus far, our experience with this procedure has been very satisfactory. The only drawback to this procedure is that the first operation must be done early after the onset of paralysis.

In cross-face nerve grafting, the result is influenced by the time after onset of paralysis; the shorter the interval between onset and surgery, the better the result. Our experience with cross-face nerve grafting has shown that acceptable functional recovery can be expected for patients in whom surgery is performed within a few months after onset of paralysis¹. If cross-face nerve grafting is done within a few months, a natural nasolabial fold can be restored at the normal position. But, it cannot improve the result sufficiently to make muscle transplantation unnecessary.

We recommend that the nasolabial fold should be created by the nerve graft, and that the smile should be reinforced by the transplanted muscle. We do not use classical hypoglossal-facial nerve anastomosis combined with a cross-face nerve graft because we are afraid of severe abnormal synkinesis of the facial muscles and elimination of the possibility of spontaneous recovery. Our cross-face nerve grafting may not interfere with spontaneous recovery , because only a small peripheral branch is cut on the

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affected side. <u>If spontaneous recovery occurs enough, successive muscle</u> <u>transplantation may be omitted.</u> For patients in whom serious damage to the facial nerve trunk seems likely, we strongly recommend this combination method as the treatment of choice.

CONFRLICT OF INTEREST

None

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Figure captions

5).

Figure 1. Medial fixation of the transplanted muscle

Figure 2. Case 1 (58-year-old woman)

(Left) Preoperative view. One month after the onset of paralysis, cross-face nerve grafting was performed.

(Center) The patient is seen 1.5 years after the cross-face nerve graft. <u>The eyebrow lift</u> by fascia suspension and upper eyelid loading by a gold plate were performed together with the cross-face nerve grafting. <u>Her abducens paralysis healed spontaneously within</u> <u>3 months after the onset</u>. The patient experienced initial functional recovery of the facial muscles 10 months after the nerve graft. The nasolabial fold recovered, though incompletely, but asymmetry remains. Two years after the cross-face nerve graft, latissimus dorsi muscle transplantation was performed.

(Right) The patient is seen 2 years after the muscle transplantation. Initial movement of the transplanted muscle occurred 8 months later. The patient acquired a clearly defined, symmetrically located nasolabial fold and showed near-natural facial animation (grade



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Facial muscle





