Split Thoracodorsal Nerve Funicular Graft Combined With Functional Latissimus Dorsi Musculocutaneous Flap Transfer for Immediate Facial Reanimation After Tumor Ablation

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The authors report a case of immediate facial reanimation resulting from functional latissimus dorsi musculocutaneous flap transfer and funicular grafting of the thoracodorsal nerve after cheek tumor ablation. After wide excision of the tumor, including the facial nerve except the temporal branch and part of the zygomatic major muscle and masseter muscle, the authors reconstructed the cheek skin and provided movement by performing a small-segment latissimus dorsi musculocutaneous flap transfer using Harii's method and the defect of the buccal and marginal mandibular branches of the facial nerve by funicular grafting from one of the two funicles of the thoracodorsal nerve. After 6 months, the transplanted, small-segment latissimus dorsi muscle showed good voluntary movement, and the lower orbiculus oris and depressor oris presented good functional recovery. The authors believe the two funicles of the thoracodorsal nerve can be used independently for two purposes: one for functional segmental muscle transfer and the other for nerve grafting to defects of branches of the facial nerve. This concept makes it possible to reconstruct multiple facial movements while minimizing donor site morbidity by means of immediate facial reanimation.

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Wide excision of the cheek region sometimes produces soft-tissue defects and facial palsy. Recent advancements in microsurgery make immediate facial reanimation possible by means of nerve grafting and functional muscle transfer. Recently Harii and colleagues[1] reported a one-stage transfer of the latissimus dorsi muscle for reanimation of a face with lasting paralysis. They achieved outstanding results by using small-segment latissimus dorsi muscle transfer.

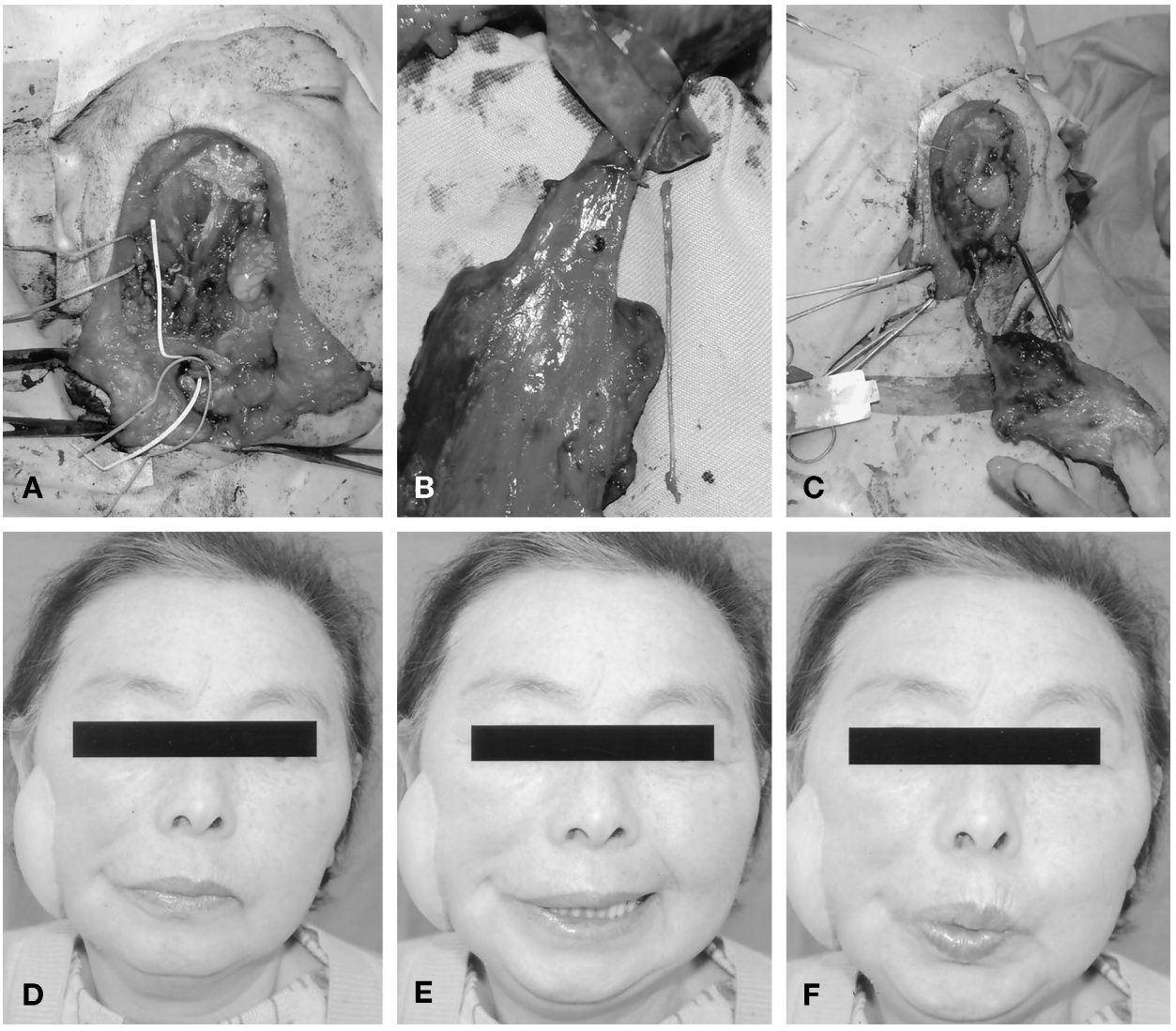
The sural nerve is used most commonly as the donor nerve in both immediate and late facial nerve reconstruction. However, combining nerve grafting and muscle transfer requires multiple donor sites. Our patient demonstrates that one funicle of the thoracodorsal nerve of the latissimus dorsi muscle can be a useful donor for nerve grafting for treatment of facial palsy.

Patient Report

A 67-year-old woman was referred to our clinic for wide excision of a Merkel cell tumor on her right cheek. A previous operation performed by other dermatologists did not ensure enough of a surgical margin.

We performed wide excision of the cheek tumor, including the masseter muscle, part of the zygomatic major muscle, and the zygomatic, buccal, and marginal mandibular branches of the facial nerve (Fig A).

The composite tissue defect was repaired with a latissimus dorsi musculocutaneous flap. When harvesting the segmental flap, we evaluated the two funicles of the thoracodorsal nerve with a nerve stimulator and selected the funicle that showed the strongest muscle contraction as the donor nerve for muscle transplantation and the other funicle for nerve grafting. A more than 10-cm nerve graft can be obtained easily by funicular dissection (Fig B). One funicle of the thoracodorsal nerve of the transplanted latissimus dorsi muscle was sutured to the zygomatic branch of the facial nerve, and the other funicle was harvested and interpositioned between the proximal and distal stumps of the buccal and marginal mandibular branches of the facial nerve. The thoracodorsal vessels were then anasto-



*(*A*) Defects of the soft tissue and the facial nerve after wide excision. (*B*) Harvest of the latissimus dorsi musculocutaneous flap and one funicle of the thoracodorsal nerve. (*C*) Completed nerve grafting and microvascular anastomosis. (*D—F*) After 6 months, the transplanted muscle showed good contraction, and the lower orbiculus oris and depressor oris showed satisfactory recovery.*

mosed to the facial artery and vein (Fig C). The postoperative course was uneventful.

After 6 months, the transplanted muscle and lower orbiculus oris and depressor oris showed good voluntary contraction, and postoperative facial palsy had improved satisfactorily (Figs D—F).

Discussion

Recently, immediate facial reanimation after tumor surgery has become popular. In most cases muscle transplantation and nerve grafting are used, depending on the defects. Many donor muscles have been reported to be usable for the reconstruction of cheek movement,[1] with the sural nerve used most commonly as a donor nerve for immediate nerve reconstruction. Combining nerve grafting and muscle transfer requires multiple donor sites. The latissimus dorsi muscle is reportedly the most reliable as a donor muscle. Tobin and colleagues[2] observed that the thoracodorsal nerve has two funicles that innervate the medial and lateral portions of the muscle independently. Dellon and Mackinnon[3] indicated the possibility of a multiple, segmental latissimus dorsi muscle transfer. We used these funicles for two purposes independently. Although we feared that the contraction of a transplanted muscle innervated by only one funicle would be

very weak, the lateral segment of the muscle innervated by only one thoracodorsal nerve funicle showed adequate contraction.

The size and length of the other funicle matched closely those of the branches of the facial nerve. Thoracodorsal nerve funicular grafting to defects of the buccal and marginal mandibular branch is thus very useful for avoiding morbidity.

We think that the two funicles of the thoracodorsal nerve can be used independently for two purposes: one for functional segmental muscle transfer and the other for nerve grafting to defects of the facial nerve branches. This concept makes it possible to reconstruct multiple facial movements while minimizing donor site morbidity by means of immediate facial reanimation.

References

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