Dual Simultaneous Systems for Facial Reanimation

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• Successful reanimation of the paralyzed face requires a specific yet adaptable procedural armamentarium. Usually, in the treatment of regional paralysis, one distinct technique is deemed most appropriate and dependable. In cases of total hemiparesis secondary to surgical ablation or trauma, however, the simultaneous use of two separate but complementary rehabilitative systems has proved valuable in 15 patients. The reconstructive concept described divides the face into two functional spheres, an upper periorbital area and a lower perioral region. The integral system includes a direct facial nerve-tocable graft reanastomosis for the upper division combined with a masseter muscle transfer for the lower facial region. The immediate supportive effects of the masaster transposition integrated with its long-term ability to rehabilitate via myoneurotization complement the more physiologically exacting effects of the nerve anastomosis.

(Arch Otolaryngol 1983;109:137-139)

Reanimation of the hemiparalyzed face secondary to total surgical ablation of the facial nerve during parotid surgery is usually accomplished either by facial nerve cable grafting, hypoglossal crossover, or muscle transposition. In this extreme case of hemiparesis, the simultaneous use of two separate but complementary rehabilitative systems has proved valuable in IS patients, extending over a period of ten years. [1,2] In 1981, Miehlke and Stennert [3] reported on their experience with a wide range of combinations of rehabilitative techniques with favorable results. Their efforts have attempted to reduce mass-movements by diversification of neural input.

The reconstruction includes a cable graft from the main branch of the nerve to the upper periorbital region with the use of approximately two to four distal reanastomotic sites that are marked and tagged at the time of ablation. The lower perioral region is rehabilitated immediately with a masseter muscle transposition. Initially, the masseter muscle functions alone in simulating expression on purposeful masticatory movements and in giving immediate support to the perioral region; this aids in the patient's control of food, saliva, and speech. Eventually, depending on the length of the cable graft, the full physiologic potential of the synchronous systems is realized and the combination allows for a very successful reanimation of the totally paralyzed face with regionalization of movement (the ability of the eye and mouth to move independently) as well as the best possible potential for simulated animation of an exacting physiologic seventh nerve-induced smile (Fig 1).

TECHNIQUE

The operative bed after total parotidectomy or severe trauma necessitating facial nerve reconstruction is prepared by marking the distal facial nerve branches in the periorbital region. The proximal facial nerve is prepared by a clean slice through the facial nerve for better and more exacting epineural approximation. The distance from the proximal facial nerve throuhg the distal receiving branches is measured and an appropriately sized cable graft is harvested from the greater auricular sensory components of the lateral part of the neck, allowing adequate length so that there is absolutely no tension involved in the anastomosis.

The facial nerve is reanastomosed under magnification using 8-0 to 10-0 monofilament nylon. An epineural suture is used proximally. Distally, a single through-and through suture isplaced for the smaller caliber nerves and a routine epineural suture is placed for the larger-caliber diameter nerves. Extrinsic supportive tubes at the reanastomotic sites are not used unless the approximation is mismatched or uneven.

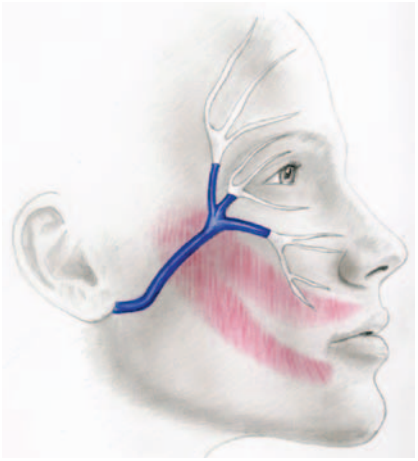

Fig 1. - Dual simultaneous reanimation system

The masseter muscle is then transposed as described previously. (4) It is lifted from its bed of attachment on the inferior rim of the mandible, appropriately back cut, no more than half the distance of its full length so as to preserve its important neurovascular supply. The upper slip is tunneled into the area halfway between the previous melolabial line and the upper lip, and the lower slip is tunneled into the inferior portion of the lip near the vermilion border. The muscle slips are sutured with two to three sutures of 4-0 silk placed into the orbicularis and into

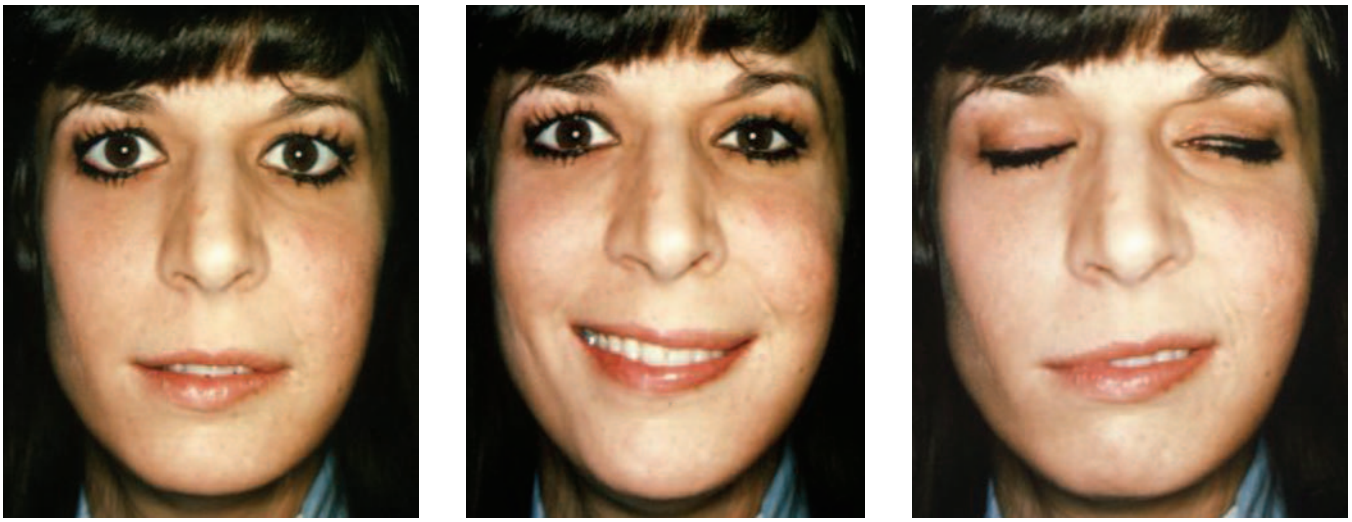

Fig 3. - One year status after radical parotidectomy for adenoid cystic carcinoma in 24-year-old woman. Left, At rest; center, smiling; and right, closing eye (note excellent regionalized animation).

Fig 4. - Nine months' status after radical parotidectomy for fourth attempt at eradication of recurrent benign mixed tumor in 19-year-old man. Left, At rest; and right, closing eye (note excellent regionalized animation).

the dermaltissue for support. The lateral perioral region is overcorrected to a considerable degree (Fig 2).

In this technique, the perioral muscles are savaged to allow for the best possible potential of myoneurotization. Closed suction drainage is used, and the extrinsic area of the face is taped and immobilized in a superior lateral position with half inch-wide paper tape. A supportivehead dressing is then used.

Hypcralimentation by nasogastric tube is continued for approximately live days. The patient's face is kept as immobile as possible with a minimum of speaking and chewing. Perioperative antibiotic therapy is used.

COMMENT

The immediate postoperative faciparalysis is ameliorated with the use of the masseter muscle transposition. This aids the physiologic control of eating and speaking, imparts a psychological advantage of early smile simulation, and allows the potential for myoneurotization of the perioral musculature. These advantages of masseter induced myoneurotization aid the complementary system of the facial nerve-to-cable graft reanastomosis by minimizing the limiting factor or muscle atrophy in the midface and lower facial muscles up to and including the inferior orbicularis as well as aiding in the regionalization of movement.

The full potential for complementary reanimation is realized approximately one year after the cable graft becomes operative. This exacting physiologic control of the facial nerve triggers the upper facial section as well as the lower facial area in some cases. The entire system, when incorporated into the upper learning centers of the cerebrum after a

considerable amount of training by the patient, allows for excellent regionalization of movement and exemplary simulation of a smile. The entire sequence of events usually reaches its peak potential in approximately two years when the patient is able to incorporate his understanding of the situation into the physiologic potentials laid down during the initial operation.

At this point in time, the combination of techniques described has proved useful in reconstructing the immediately paralyzed face during a major parotid operative procedure. The concept of delay in the eye control has to be handled on an individual basis. In certain cases, especially in the older population, a lateral canthoplasty (tarsorrhaphy) is performed until the facial nerve functions. In other cases, especially in the younger patient population, the eye can be managed with generally symptomatic treatment and patient educationas to protection, lubrication, etc.

Figures 3 and 4 show the dramatic results that may be accomplished. Both patients had normal facial movement preoperatively. It is difficult, however, to assess and evaluate some of these results because of the overlapping neural and muscular patterns and the very impressive results in many of the individualized techniques that are being used. There is no carte blanche endorsement for this technique as an exclusive operation for facial rehabilitation. The technique does not supersede the standard of facial nerve grafting or hypoglossal cross-over when the situation and criteria are met for these procedures. There is, however, interest to pursue and study the excellent results that can be obtained with a dual simultaneous approach.

References

1. Conley J. Gullane P: Treatment of the para lyzed face in Shmurick DA, Paparella MM (eds): Otolaryngology, ed. 2. Philadelphia, WB Saunders Co, 1980 pp 2874-2877.
2. Baker DC, Conley J: Facial nerve grafting A A 30-year retrospective review. Clin Plast Surg 1979;6:346-360.
3. Miehlike A, Stennert E: New techniques for optimum reconstruction of the facial nerve in its extemporal course. Acta Otolaryngol 1981;91:497-503.
4. Conley J, Gullane P: The masseter muscle flap. Laryngoscope 1978:88;605-612.

Accepted for publication July 8, 1982.
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