PERMANENT FACIAL PARALYSIS

the method of
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Successful reanimation of the permanently hemiparalyzed face is perhaps the most challenging technical procedure that facial surgeons perform. The exquisite complexity of the facial motor system allows for an endless variety of emotional expression as well as providing for eye protection and control of speech, eating and salivation. Although the exact duplication of this system is impossible, by using the techniques described in this chapter, one can accomplish a remarkably natural reconstructive results.

The definition of hemiparalysis in context of this discussion is a totally nonfunctional proximal facial nerve, derived from trauma, surgical ablation, necrosis, inflammation, or infection. In reality, the vast majority of these cases stem from either surgical manipulation during intracranial cranial tumor surgery or necrosis secondary to stroke. A small percentage of Bell's palsy patients may progress to a hemiparalysis of this severity

OVERVIEW

Objectives

In undertaking a reconstruction of this magnitude, it is imperative that the surgeon outline for himself and the patient realistic and definable goals.

The aim of facial reanimation is to restore both the original aesthetics and function to the paralyzed face. The primary concerns are, of course, physiologic-including both restoring the ability of the eye to close and the competence of the oral sphincter.

Of secondary concern, although almost as important (especially to the patient), are the cosmetic aspects of a normally functioning face. It is impossible with any currently available facial reanimation procedure to duplicate even approximately the immense diversity of facial expression that is deemed "normal. " Instead, the intelligent surgeon must be content to simulate a near normal physiology of facial movement with an adequate cosmetic effect.

These goals are accomplished by allowing the orbicularis oculi muscles to close and secondarily to impart competence to the oral sphincter, so that speaking and eating are readily handled. The cosmetic goals are more elusive but should include the restoration of normal facial tone and the ability to smile.

Reconstructive Philosophy

Successful reanimation requires the use of an operative procedure that allows the face to mimic natural movement. Normally the eyes and mouth move independently. When one is blinking, the mouth does not move, and when one is smiling or eating, the eyes do not close. To simulate this discrimination of movement, a new reconstructive procedure was developed to direct these different functions intrinsically. In cases of permanent proximal facial nerve paralysis, the simultaneous use of two separate but complementary rehabilitative systems has proven extremely valuable. This reconstructive concept (Dual Simultaneous Systems-2) divides the face into two functional spheres: an upper periorbital area and a lower perioral region. The integral system includes a direct anatomy of a split hypoglossal nerve, to the upper division of the facial nerve (for the upper sphere) combined with a masseter muscle transposition (for the lower region). By treating the upper and the lower zones of the face separately, patients regain a more natural facial expression and more coordinated physiologic movements.

DUAL SIMULTANEOUS FACIAL REANIMATION

Technique

First, the hypoglossal nerve is split and reanastomosed to the upper division of the facial nerve to reanimate the upper facial zone (Fig. lA). By splitting the hypoglossal nerve instead of taking the whole nerve (as is done in the hypoglossal crossover operation), tongue movement remains normal. To restore the lower face movement, the masseter muscle is divided into two parts and moved into the oral region. One part with its accompanying nerves derived originally from the fifth cranial nerve is positioned above the mouth, while the other is positioned below (Fig. 1B).

The masseter muscle functions almost immediately after the operation. A near normal smile is achieved by a self training program of looking in the mirror while smiling. Eventually, through this type of biofeedback, the brain will realize that the chewing muscle is now in a new location and will allow the patient to smile at will. The nerve graft to the eye takes about 9 months to impart some tone and about 18 months for movement to begin. During this interim, the eye can be managed with generally symptomatic treatment and patient education as to protection and lubrication of the eye. In older patients, a lateral canthoplasty can be performed until full movement and tone are operational. Within approximately 18 months, movement of the periorbital muscle is achieved as well as the all-important involuntary blink function. During the next 6 months, a coordinated facial movement takes place with both systems blending together and working as a team. The inherent difference in the nerve supplies of the two systems (cranial nerves V and XII) obviates the terrible, disabling hemifacial spasms that may occur with the hypoglossal transposition alone. The final stage of the reconstruction occurs as the fine nerves flow out from the transposed masseter muscle into the surrounding facial muscle, giving them increased tone and eventually purposeful movement and thus adding to the repertoire of expressive facial motion. This myoneurotization also inhibits further atrophy of the face and aids in the regionalization of movement. The entire sequence of events usually reaches its peak potential within approximately 2 years, when the patient is able to incorporate his understanding of the situation into the physiologic potentials created during the initial operation.

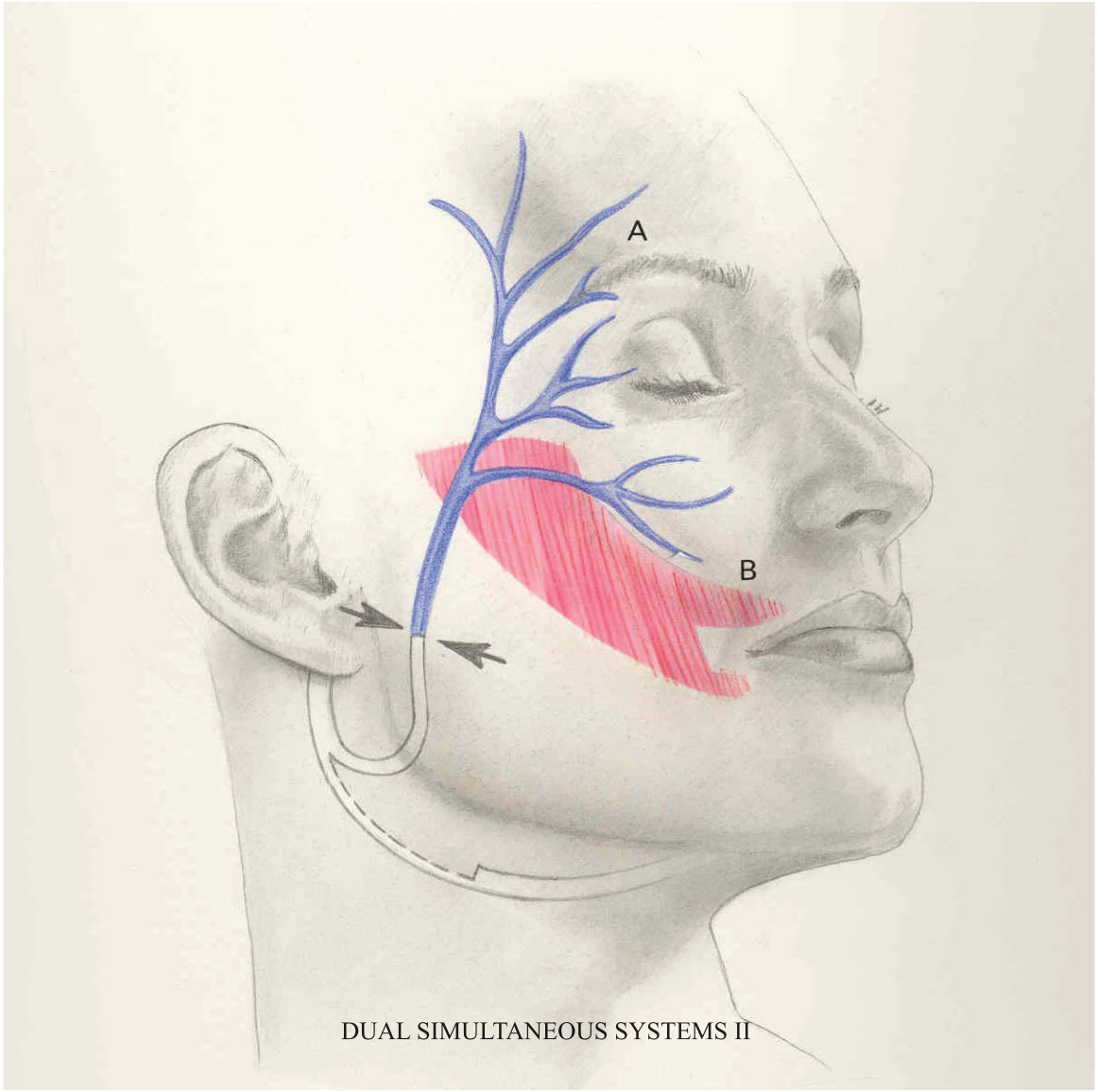

Figure 1 The complete reanimation system, combining the split hypoglossal nerve connected to the upper division of the facial nerve **A.** with a masseter muscle transposition **B**.

Technical Highlights

Although the Dual Simultaneous Systems-2 operative procedure is fairly straightforward, there are certain technical considerations that can be used to result in a smoother operation with more consistent results.

Of utmost importance when performing the nerve anastomosis is adequate exposure of hypoglossal nerve, so that the correct length of split nerve can be obtained to insure minimal anastomotic site tension. The actual splitting of the nerve is facilitated by keeping the nerve on stretch, held tightly by two wide rubber bands that are usually reserved for arterial anastomosis procedures. A No. 11 surgical blade or razor blade gives the most exacting result during the actual splitting technique. Of course, microscopic control and an assistant to steady the nerve to keep it from rotating are essential for cutting the fascicles transversely.

The facial nerve is connected to the hypoglossal nerve under microscopic magnification, using the 10-0 monofilament nylon. An epineural suture is used to bunch together the exposed fascicles, which are evident in the split hypoglossal section of never. Extrinsic support tubes, appliances, or tissue adhesive are not used.

In managing the masseter transposition, the most important step is to prevent denervation of the muscle during the back-cutting procedure. Adequate knowledge of this innervation is thus essential. The actual suturing of the masseter to the perioral region must include a stitch of 4-0 Mersilene or its equivalent into the actual dermis so that adequate support is generated.

SUGGESTED READING

Sachs M, Conley J. Dual Simultaneous systems for facial reanimation. Otol 1983; 109:137-139.

Sachs M, Conley J. Intraoral masseter muscle transposition. Arch Otol 1982; 108:397-400.