Facial Paralysis Reconstruction

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KEYWORDS

• Facial nerve • Facial nerve paralysis • Static facial reconstruction
• Dynamic facial reconstruction

KEY POINTS

- Optimal facial rehabilitation must address each affected zone of the face: lower lip, oral commissure, midface, ocular region, and brow.
- Since its introduction, the gracilis free muscle flap has revolutionized facial reanimation by achieving the critical goals of restoring spontaneous facial motion and functionality to the paralyzed face.
- Reconstruction after radical parotidectomy involves both facial nerve reconstruction and volume restoration of the surgical defect commonly with free tissue transfer.

INTRODUCTION

Facial nerve paralysis is a debilitating condition that affects an estimated 20 to 30 per 100,000 people per year.[1] The facial nerve is responsible for the innervation and control of the muscles of facial expression, or the facial mimetic muscles. With loss of this function, there is a pathologic relaxation and droop of the eyebrow, eyelid, cheek, and corner of the mouth.[2] Speech, oral competence, vision, and expression of emotion may be compromised, with significant effects on the overall quality of life of affected patients.[3,4] The psychological and social implications of this disorder cannot be understated, because facial expressions play a pivotal role in interpersonal communications. Facial paralysis can encumber this critical function, giving rise to feelings of social isolation and depression in affected individuals.[3,5]

The authors have nothing to disclose.
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Otolaryngol Clin N Am 49 (2016) 459–473
http://dx.doi.org/10.1016/j.otc.2015.12.002 **oto.theclinics.com**

A facial paralysis is referred to as acute paralysis within the first year of onset and chronic paralysis thereafter. Pathologic conditions that target structures along the course of the facial nerve such as brainstem masses, temporal bone trauma, parotid neoplasms, or traumatic injury to the face may impair the function the facial nerve, resulting in facial paralysis.[6] Given its divergent origins, the variety of settings on which it may first be diagnosed, and its wide-ranging effects on the affected individual, facial nerve paralysis is best managed through a multispecialty, team-oriented approach. The goal of the current review is to provide a contemporary summary of the surgical management of facial nerve paralysis, procedures that are collectively referred to as facial reanimation.

SURGICAL MANAGEMENT

The facial nerve has a long, circuitous course, traveling from the brainstem through the temporal bone to eventually emerge via the stylomastoid foramen. The nerve then enters into the parotid gland and divides into 5 major branches: temporal, zygomatic, buccal, marginal mandibular, and cervical. Facial nerve paralysis may affect some or all branches of the facial nerve. The facial nerve innervates the facial musculature in a zonal pattern, and as such, the specific disabilities suffered are contingent on the affected facial subunits. Historically, the goals of facial reanimation were simply to provide eye closure for corneal protection and oral competence to prevent drooling. However, advances in facial reanimation techniques have made it possible to achieve these basic goals as well as to attain facial symmetry both at rest and with movement. To this end, attempts at optimal facial reanimation must address each affected zone of the face: lower lip, oral commissure, midface, ocular region, and brow. Furthermore, defects following radical parotidectomy offer unique challenges for the reconstructive surgeon.

Lower Face and Midface

The facial musculature acts to provide oral competence, express emotion through smiling, and augment nasal breathing by flaring of the nostrils. With loss of this function, patients may suffer from drooling, nasal airway obstruction, esthetic deformity, and emotional distress.[2,3,6] Surgical interventions are therefore targeted at restoring or replicating the native function of the facial musculature.

Static reconstruction

Generally, facial paralysis reconstructive techniques may be classified as static or dynamic. Static reconstruction techniques have historically acted as the workhorse of facial reanimation by repositioning the pathologically relaxed soft tissues of the face to counteract the effects of gravity (ie, facial droop) and provide symmetry at rest.[2] In addition, static reconstruction can restore oral competence as well as improve external nasal valve collapse.[5] Static reconstruction of the lower face can be accomplished with the use of "sling" suspension techniques. Using a facelift approach, a skin flap is elevated in the subcutaneous plane medial to the oral commissure and nasolabial fold, exposing the muscle fibers of the orbicularis oris if present. A "static sling" is then sutured medially to the oral commissure, lower lip, and nasolabial fold. The lateral aspect of the sling is then secured to the temporalis fascia or the zygomatic arch, to provide appropriate elevation of the soft tissue and symmetry at rest (**Fig. 1**).

Expanded polytetrafluoroethylene (ePTFE; Gore-Tex, W.L. Gore & Associates, Flagstaff, AZ) is a common synthetic material that has been used for static facial reanimation of the lower face.[7,8] However, concerns have been raised regarding the high rate of complications, including loss of tensile strength with time, graft infection, and need for revision surgery.[2] Alternatively, freeze-dried acellular human dermis