

Static and Dynamic Repairs of Facial Nerve Injuries

Hilliary White, MD^{a,b}, Eben Rosenthal, MD^{c,*}

KEYWORDS

• Static repair • Dynamic repair • Facial nerve paralysis

KEY POINTS

- Understanding and use of the House-Brackmann scale to communicate the degree of facial nerve weakness is important in documentation and communication to monitor for changes in function.
- Patients presenting with facial nerve weakness of gradual onset (weeks or months) should be considered to have a tumor until proved otherwise.
- Management of functional issues, especially eye closure, is critical and should be addressed aggressively; cosmetic concerns should be addressed secondarily.
- Primary facial nerve grafting at the time of injury or resection wherever possible provides the best long-term outcome.

INTRODUCTION

Facial expression is critical for daily communication. As a result, facial nerve dysfunction can be a catastrophic condition by imposition of numerous negative effects on the cosmetic, functional, social, psychological, and economic aspects of a person's life. The facial nerve is the most commonly paralyzed nerve in the human body. Facial paralysis can inhibit and mar facial expression, communication, symmetric smile, eye protection, and oral competence.¹

A thorough evaluation includes a complete history and physical examination and directs the surgeon to the appropriate treatment modality. The surgeon must decide on the most appropriate method of reconstruction based on the findings of a detailed medical assessment of the patient, a thorough evaluation of the disease process, and sound judgment. History should include a determination of the location, extent, and degree of paralysis; cause of the nerve injury; duration of paralysis; and time delay between injury and presentation. Patient history is critical to differentiate paralysis likely to

recover spontaneously, such as Bell palsy or a temporary iatrogenic injury, from paralysis that is related to permanent injury or undetected malignancy. The cause of the paralysis determines the best course of management. However, treatment must be individualized based on life expectancy, age, patient preferences, and cosmetic or functional deficits.

FACIAL NERVE ANATOMY

The nerve is divided into 3 main segments: intracranial, intratemporal, and extratemporal. The intracranial segment originates in the pons and is a 23-mm to 24-mm segment from the cerebello-pontine angle to the internal auditory canal. The nerve then courses through the temporal bone, where it is divided into multiple named segments: the meatal portion (8–10 mm), the labyrinthine portion (3–5 mm), the tympanic/horizontal segment (8–11 mm), and the mastoid/vertical segment (10–14 mm). The extratemporal segment exits the skull base at the stylomastoid foramen and travels within the parotid gland, then

^a Head & Neck Surgery Center of Florida, Florida Hospital Celebration Health, Suite 305, 410 Celebration Place, FL 34747, USA; ^b Otolaryngology Head and Neck Surgery, University of Central Florida College of Medicine, 6850 Lake Nona Boulevard, Orlando, FL 32827; ^c University of Alabama at Birmingham, 563 Boshell Building, 1808 7th Avenue South, Birmingham, AL 35294, USA

* Corresponding author.

E-mail address: erosenthal@uabmc.edu

subsequently divides at the pes anserinus into the upper and lower divisions, which then divide further into the 5 branches of the facial nerve: frontal, zygomatic, buccal, marginal mandibular, and cervical.²

ASSESSMENT OF INJURY

After traumatic injury, it is critical to determine if the nerve has been transected. This assessment can often be made by a good physical examination (Figs. 1 and 2). Even heavily sedated and uncooperative patients grimace in response to stimuli and this is often sufficient to assess nerve continuity. The suspected location of the nerve transection also determines the need for intervention. Distally located injuries in the end-organ musculature are not so amenable to primary repair compared with more proximal injuries.^{3,4} The lateral canthus is used as an anatomic landmark and any transection medial to this landmark is generally not amenable to repair. In the early stage of injury, nerve function is either absent or present, but it is critical to perform assessments over time to determine any warranted secondary interventions. A standard reporting system that is simple, but clinically meaningful, is critical to reporting and following facial nerve function. The most widely accepted nerve classification system is the House-Brackmann scale. This scale assesses the degree of voluntary movement present to document the grade of facial paralysis. The House-Brackmann scoring system was established by the American Academy of Otolaryngology-Head and Neck Surgery as the



Fig. 2. The level of facial nerve paralysis was House-Brackmann grade V. (From Tanigawa T, Tanaka H, Sato T, et al. Craniometaphyseal dysplasia unnoticed until 19 years of age: First diagnosed from facial nerve paralysis. *Auris Nasus Larynx* 2011;38(3):408.)

standard means of reporting facial nerve function and recovery after facial nerve injury (Table 1).

ELECTRODIAGNOSTIC TESTING

Electrodiagnostic testing is a method of evaluating the degree of injury to the facial nerve and the integrity of the facial musculature. This test can add valuable information about the nature of the injury, especially in those circumstances in which the extent of injury is unclear (iatrogenic) or the patient is a poor historian. This information can be used to determine if the nerve injury will benefit from surgical intervention or may be best managed conservatively. A variety of electrical tests are

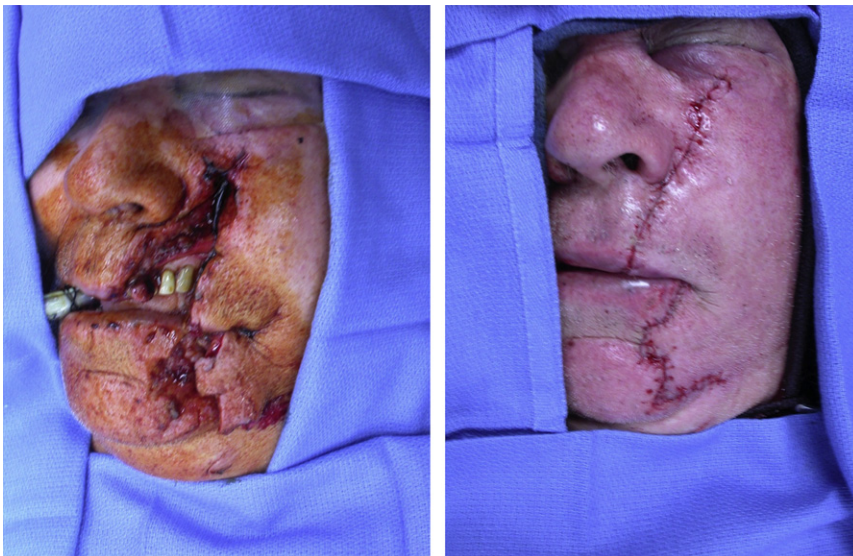


Fig. 1. Traumatic injury to left face with injury to the facial nerve located medial to the left lateral canthus.

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