

Chapter 18

Extra-Temporal Facial Nerve Reconstruction

ABSTRACT

Hypoglossal-facial anastomosis (HFA) as an end-to-end anastomosis (EEA) has several advantages, and indirect HFA with interposition graft is a safe and excellent method. The extended HFA is the method of choice for all malignant tumors that require extensive resection of the facial plexus, especially when combined with a neck dissection. Facio-facial anastomosis combined with HFA leads to excellent results when resection defect is restricted to the central portion of the facial plexus. Good functional rehabilitation of the musculature of the oral sphincter system is achieved using the hypoglossal nerve. To innervate the musculature of the ocular sphincter system, a facio-facial anastomosis between the nerve trunk and the cranial nerve branches is made using a free nerve transplant. Dynamic reanimation involves nerve repair, nerve transfer, regional muscle transfer, or free-muscle transfer. Dynamic reconstructive techniques can yield improved facial symmetry, spontaneous and symmetrical smile, eye closure and protection, and oral competence.

CONSEQUENCES OF FACIAL NERVE DAMAGE (AXON DEGENERATION)

The facial nerve is the “connecting cable” between the central nervous system (CNS) and the facial muscles. The vital conditions of this threefold system have to be taken into account, especially in cases of delayed reconstruction.

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As a consequence of any severe facial nerve damage leading to axon degeneration, this degeneration results: a) Centrally, in retrograde changes to the motor neurons and their cellular environment (Blinzinger, 1968; Graeber, 1986; Graeber, 1994; Guntinas-Lichius, 1994a; Guntinas-Lichius, 1994b; Guntinas-Lichius, 2005; Kreutzberg, 1982; Steit, 1994; Tetzlaff, 1986), and b) Peripherally, in the degeneration of muscle fibres (Goebel, 1994; Irintchev, 1994). Reversibility or irreversibility of these degenerative processes depends on the *time* that has elapsed between nerve injury and reinnervation of the musculature.

Facial nerve denervation and paralysis imposes significant psychological and functional impairment. Facial paralysis can inhibit and mar facial expression, communication, symmetrical smile, eye protection, and oral competence. The physician must accurately evaluate and examine the patient and determine the etiology, duration, and the scale of the paralysis.

GOALS AND LIMITATIONS OF RECONSTRUCTION

Reconstructive nerve surgery must be performed as soon as possible, either as a one-stage operation with tumor resection or, if a histopathological analysis of the specimen is necessary, within 10-14 days at most because of the rapid development of scar tissue. Dynamic and static reconstruction procedures are employed for facial reanimation in patients suffering from facial nerve paralysis (Gordin, Lee, Ducic, & Arnaoutakis, 2015). However, dynamic strategies tend to be more successful and fruitful and should be offered to patients considering reconstruction, unless health risk contraindications exist.

The most common approaches for reconstruction are direct facial nerve repair with or without grafting, nerve transfer, cross-facial nerve grafting, and muscle transfer (regional or free) (Gousheh, 2011; Chan, 2011; Robey, 2011; Meltzer, 2010). Understanding facial nerve anatomy with precise assessment of the patient's paralysis and health status dictate the potential for recovery and the appropriate reconstructive scheme.

Goals of Reconstruction

The goals of the reconstruction in facial paralysis include the following:

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