

Head: Facial palsy

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Copy: Think about the last face-to-face conversation you had. Consider how much your communication and understanding was derived from facial expression. Remember the feelings expressed, the subtleties conveyed, the joy or anguish instantly revealed. Now imagine the frustration and isolation felt by someone whose face does not speak — no smile, no blink, no pucker for a kiss. Facial paralysis can affect only a small part, or sometimes half, of the face. Occasionally, the entire face is enveloped in a mask-like silence. But whether it is a small area affected or the entire face, facial palsy is a devastating problem. Fortunately, there are some answers.

Nearly 40 muscles control our facial expressions. Used in various combinations, these muscles are capable of creating more than 5,000 different expressions. Almost all of these muscles are controlled by a nerve appropriately called the facial nerve. The facial nerve exits the skull behind the opening of the ear, then travels through the parotid gland in front of the ear, branching extensively to reach all of the muscles of facial expression. In people with facial paralysis the nerve can be absent at birth, rendered non-functional by virus or inflammation, or injured by trauma or surgery. Injury to this nerve can occur inside the skull, outside the skull before the nerve branches or to any of the individual branches. The exact location of the injury will determine the resulting deficit and ultimately direct the treatment.

Static reconstructions, some of the earlier methods of reconstruction, still have a few limited applications. As implied by the name, static reconstructions do not move the face. They involve the suspension of facial tissues in a more normal (less drooping) resting position. These techniques can significantly improve resting appearance and oral competence (drooling) but do nothing to provide animation to the face. Animation requires nerve input and muscle response.

When a nerve is injured, the nerve fibers between the injury and the target muscle die. These fibers then regenerate at a rate of about one millimeter per day. If an injury to the facial nerve or branch does not involve a loss of length, then the injured nerve can be re-approximated directly. It will still take several months for activity to return to the muscle, as the nerve regenerates towards the target muscle.

If there is a loss of length of the nerve, as when a segment is removed with a tumor, then a nerve graft can be harvested from another part of the body, usually the leg, and attached between the two cut ends of the facial nerve. The facial nerve fibers then grow through this nerve graft to the target muscle. Alternatively, if the facial nerve is resected all the way back to where it exits the skull, a nerve graft can be placed from the facial nerve on the unaffected side of the face to the remaining nerve on the affected side of the face. This is called a cross-face nerve graft.

In cases of congenital or any long-standing facial paralysis lasting more than one to two years, the target muscle atrophies and can no longer be stimulated by a nerve. Reanimation of a longstanding facial paralysis, therefore, requires new muscle, which can be stimulated to be placed in the face.

Local muscle transfer involves the use of other nearby facial muscles, primarily those used for chewing, to provide movement for the face. These muscles are controlled by a different nerve, which is usually not affected by the paralyzing process. Some of the more common techniques involve the use of the temporalis muscle or the masseter, two muscles used in chewing, or a combination of the two. While some facial motion can be gained with this type of reconstruction, the movements are often unnatural and never spontaneous, as the person needs to learn to "bite-down" to create a smile.

The most complex but also the most promising technique for facial reanimation is a combination of cross-face nerve graft and functional free muscle transfer. Transfer of a muscle to the face requires microsurgical reconnection of the blood vessels of the muscle to blood vessels in the face. In addition, there must be a microsurgical connection of the nerve of the muscle to a nerve in the face. There are several muscles that are frequently used, including the gracilis from the inner thigh, the pectoralis minor from the chest, and the serratus from the trunk. Each has its benefits and drawbacks, its proponents and critics.

Free muscle transfer for facial palsy requires at least two procedures. First, a cross-face nerve graft is connected to segments of the facial nerve on the unaffected side. The nerve graft is then tunneled to the paralyzed side and left under the skin in front of the ear, or in the upper lip. Nine to 12 months later, after the facial nerve fibers from the unaffected side have grown through the graft to the paralyzed side, the free muscle is transferred to the paralyzed side of the face. Its blood vessels are connected to blood vessels in the area, its muscle fibers meticulously oriented to produce the appropriate smile angle, and the nerve to the muscle connected to the cross-face nerve graft. After a couple of months to allow the facial nerve fibers to grow into the muscle, function slowly returns.

In people with bilateral facial palsy, such as in Mobius syndrome, a cross-face nerve graft is not possible since neither side of the face has a normally functioning facial nerve. Here there is no choice but to use different nerves, such as the nerve to the masseter (chewing) or to the hypoglossal (tongue movement) to control facial movement. In separate procedures muscle is transferred to each side and one of these nerves connected to the muscle. While spontaneity remains a challenge, symmetry can be quite good.

Regardless of the cause, facial palsy can be quite devastating. While reanimation of the face remains a significant challenge, there are reconstructive options available to restore facial movement and

thereby significantly improve socialization and self-esteem. Today the face that does not speak need not remain silent.

Loose now and then

A scattered smile, and that I'll live upon.

— William Shakespeare

As You Like It, Act III, Sc. 5