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## Trigeminal Neuralgia and Hemifacial Spasm

*A guide for you and your family*



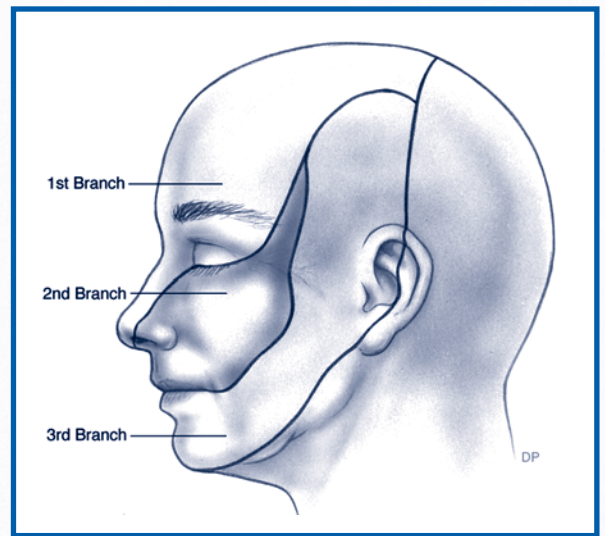
## TRIGEMINAL NEURALGIA

As you probably know, trigeminal neuralgia is commonly called “tic douloureux” or just “tic.” When severe, it is the most excruciating pain known to man. This pain most frequently involves the lower lip and lower teeth or the upper lip and cheek, but it also may involve the nose and the area above the eye.

Routine pain medications often are ineffective in controlling the pain. The most effective drug is Tegretol. However, it has potential serious side effects. Dilantin, Baclofen and Neurontin have been used but have not been as effective as Tegretol.

Most patients referred to us already have tried these medications without benefit, or their doctors have decided the risks of continued use of these drugs are too great. If you desire further treatment with these medications, arrangements should be made with your personal physician or with a neurologist.

In planning a surgical procedure for trigeminal neuralgia, it is important to determine which branch of the trigeminal nerve is involved. The trigeminal nerve has three branches (See figure 1). In general, these branches correspond to the upper, middle, and lower portions of the face.



*Figure 1*

The first (upper) branch includes the eye, eyebrow, and forehead. The second (middle) branch corresponds to the upper lip, upper teeth, upper gum, cheek, lower eyelid, and side of the nose. The third (lower) branch involves the lower lip, lower teeth, lower gum, and one side of the tongue. It also includes a narrow area that extends from the lower jaw in front of the ear to the side of the head.

Trigeminal neuralgia most commonly involves the middle (second) and lower (third) branches but may involve the upper (first) branch alone, any two branches, or all three branches.

After identifying the affected branch, the next decision is the selection of an operative procedure. We perform several types of surgical procedures for trigeminal neuralgia. The most common are the microvascular decompression (MVD), the radiofrequency lesion procedure (RFL), and radiosurgery.

The microvascular decompression procedure is a major operation designed to minimize facial numbness as part of the treatment.

The radiofrequency procedure is a more minor, needle-type procedure, designed to relieve pain by causing numbness in the face in the region of the branch or branches involved in the pain. Radiosurgery is a non-invasive procedure which involves focusing hundreds of small beams of radiation on the trigeminal nerve. Facial numbness is an infrequent side effect.

Department of Neurosurgery faculty have performed more than 2,000 operations for trigeminal neuralgia. We currently perform approximately 150 operations each year for this disorder.

### MICROVASCULAR DECOMPRESSION PROCEDURE

The microvascular decompression procedure is the operation recommended for a healthy person who does not want numbness of the face and is willing to accept a major operation entering the skull. It relieves trigeminal neuralgia by placing a small pad between the trigeminal nerve and the blood vessels next to the nerve (See figure 2).

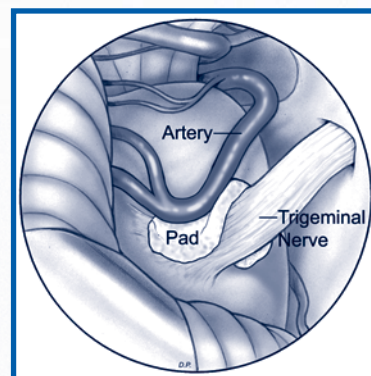


Figure 2

The operation requires making an incision in the back of the head, creating a small hole in the skull, and lifting an edge of the brain to expose the trigeminal nerve, which is located approximately two inches deep (See figure 3). The incision is made behind the ear on the side of the head where the patient feels pain.

The blood vessels that press on the nerve where the nerve leaves the brain are exposed and pushed away from the nerve. A small pad is inserted between the nerve and the vessels. This relieves the pain in most patients.

The operation requires a general anesthetic. Complications are infrequent, but can include facial numbness, facial weakness, bleeding, double vision, infection, hearing loss, stroke, spinal fluid leakage, or hydrocephalus. Serious complications are rare.

Recurrent pain following the operation occurs in about 20 percent of patients.

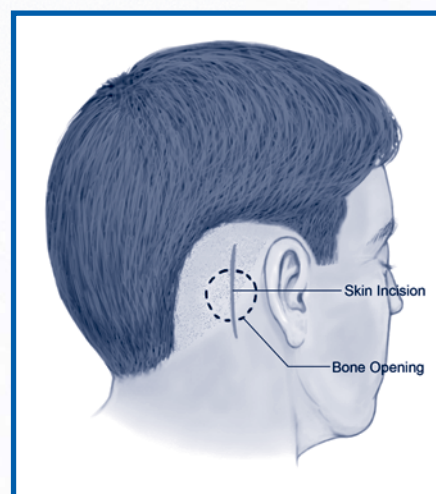


Figure 3

If the pain recurs (typically several years later), another microvascular decompression operation or radiofrequency lesion procedure (described later) may be required.

The preoperative evaluation is done by the doctor and the Anesthesia Service as an outpatient prior to the operation. The patient is admitted to the hospital on the day of surgery. The surgery typically takes about 45-60 minutes. Most patients spend two nights in the hospital. Intensive care is usually not required. The patient should plan on taking approximately two weeks off work after surgery. A follow-up appointment is scheduled four weeks after leaving the hospital.

### RADIOFREQUENCY LESION PROCEDURE

The term “radiofrequency” refers to the radiofrequency heating current, which is used to destroy the trigeminal nerve cells.

Relief of the neuralgia by this method involves making the region of the pain permanently numb. Numbness can be achieved by a variety of means. A Novocain injection, such as might be done by your dentist, may numb the area to control the pain for a few hours. In an attempt to give longer relief, alcohol may be injected into the nerves. The numbness and relief with an alcohol injection may last from a few weeks to many months. It is uncommon for an alcohol injection to relieve the pain beyond 6 months. The reason an alcohol block is not permanent is that the nerve regenerates after this form of treatment. Another method of treating tic involves cutting the nerves outside the skull, but this usually gives only temporary relief. An operation to cut the nerves inside the skull gives more permanent relief, but the operation carries significant risks and is no more effective than the radiofrequency procedure in most patients.

The radiofrequency lesion procedure is performed in the operating room with the patient lying horizontally on his or her back. A needle is passed, under X-ray control, into the cheek on the side of the face where the patient feels pain and through a small, natural opening in the base of the skull into the trigeminal nerve (See figure 4).

The patient is put to sleep for a few minutes during the insertion of the needle and during the other painful parts of the operation. This is accomplished with a medication called Brevital, which results in a very brief period of sleep.

After inserting the needle, a small electric current is passed through the needle causing tingling in the face.

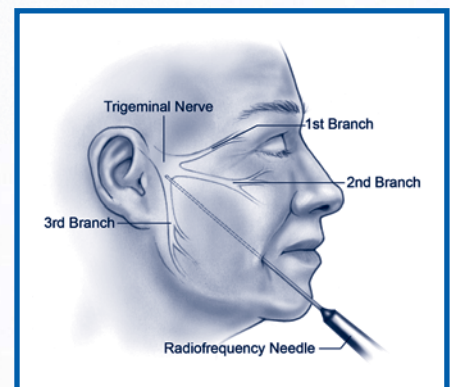


Figure 4



When the needle is positioned so the tingling occurs in the area of the tic pain, the patient is put to sleep again, and a radiofrequency current is passed through the needle to destroy part of the nerve.

The patient is awakened a few minutes after completing the nerve lesion and is checked to determine if there is enough numbness in the face to give pain relief. The radiofrequency lesion procedure is repeated with the patient asleep until it has resulted in the desired numbness.

Patients are evaluated in the clinic the day before the procedure. Patients are instructed to go to the outpatient surgery desk on the morning of the operation and are taken to the operating room from there. In most cases, this procedure takes 15-30 minutes. When the lesion procedure is completed, patients go to the recovery room for about two hours after which they can go home. They are usually able to eat the next meal. The numbness with this procedure often is permanent. Should the numbness wear off, there is a chance of recurrent tic pain. Patients are asked to inform us of their progress one month following the procedure. A follow-up appointment is scheduled if needed, to review any concerns. However, since many of our patients come long distances, we do not recommend a recheck if the long trip would be inconvenient. Of course, we are most happy to see patients any time if they feel we can be of assistance.

Several side effects may follow the procedure. The purpose of the procedure is to produce permanent facial numbness, which feels just like a Novacain injection. Some patients find the numbness to be unpleasant. The patient may describe this sensation with words, such as it "itches," "tingles," "burns," "draws," "pulls," "crawls," or it is "woody" or "stiff, like cement." Some patients find that the numb area seems irritated or aches. Very few patients will find this sensation more disagreeable than their original tic pain. The overwhelming majority feel the numbness is far more preferable than the intense tic pain. The numbness is permanent and may extend to the area along the front part of the ear and even up to the forehead. If a person finds the numbness disagreeable, very little can be offered, except medication. You should not have this procedure if you do not want permanent numbness in your face.

The second most common side effect is weakness of the chewing muscles on the side of the head where the patient feels the pain. Many people describe the weakness as a change in their bite or as an inability to chew on the side of the lesion. This weakness usually recovers six to eight months after the procedure. A few patients note pain around the ear because of chewing muscle weakness and looseness in the jaw joint, but this disappears when the muscle recovers.

The third side effect is an unwanted spread of numbness to the adjacent branches of the nerve and to the eye. In some cases, we actually are trying to numb the area in and surrounding the eye because the pain is situated there. Numbness of the eye itself is not harmful, but if foreign matter enters the eye, the patient would not feel it. Inflammation, scarring of the cornea, and reduction or loss of vision could result.

To prevent this, we recommend each patient inspects the eye regularly with a mirror and to see an eye doctor if the eye becomes red or appears irritated, even though he or she may not experience pain.

Some patients experience temporary dysfunction of the Eustachian tube which causes the ear to feel “stopped up.” A few cases of double vision have been noted after the procedure, but none of these have been permanent.

## **RADIOSURGERY**

Radiosurgery is a treatment which involves focusing hundreds of small beams of radiation on the trigeminal nerve. Patients are seen in the preoperative clinic on Monday afternoon for a complete discussion of treatment options. If they elect to proceed, they return on Tuesday morning. The patient is given valium prior to the procedure. The first part of the procedure is head ring application - a metal ring is attached to the head at four spots after they are numbed with local anesthetic. A CT scan is then performed. CT and MRI images are transferred to a special computer where the radiosurgery plan is developed. The patient is then connected to a special radiation producing machine (called the Trilogy) and the treatment is started (Figure 5). The actual treatment takes about 40 minutes. The head ring is then removed and, after a short period of observation, the patient can return home. Because there is no general anesthesia or surgical incision, the patient can return to completely normal activity the next day.



*Figure 5*

Radiosurgery usually takes 1-2 months to produce pain relief, so patients with more severe pain may be better off with an RFL or MVD. Approximately 50% of patients will eventually be pain free and off medications after radiosurgery. As with other procedures, some patients experience recurrent pain and require additional surgery. A relatively small number of patients experience facial numbness after radiosurgery, which is the only commonly reported side effect.

## **HEMIFACIAL SPASM**

Hemifacial spasm is a condition similar to trigeminal neuralgia and is due to abnormal discharge of another nerve called the “facial nerve.” In trigeminal neuralgia, the abnormal discharge is in a pain-bearing trigeminal nerve.



In hemifacial spasm, the abnormal discharge is in the facial nerve, which supplies the muscles of the face and thus causes abnormal twitching or spasm of the muscles of the face (Figure 6).

No drug has proven effective in preventing or stopping hemifacial spasm. Muscle relaxants and the drugs used for trigeminal neuralgia commonly are given to patients with hemifacial spasm, however, they rarely help. In the past, attempts were made to cut or crush branches of the facial nerve. However, these destructive procedures were associated with facial paralysis, and when the paralysis recovered, the spasms returned.



*Figure 6*

One form of creating damage to the facial nerve now in current use involves injecting a bacterial toxin into the nerve (Botox). This results in relief of the spasms by causing weakness of some muscles of the face. It often is necessary to repeat the injections after two to six months.

The most effective treatment of the hemifacial spasm is a microvascular decompression procedure of the facial nerve. The procedure is similar to the microvascular decompression procedure described in the section on the treatment of trigeminal neuralgia, however, this procedure is directed to the facial nerve, approximately one-half inch away from the trigeminal nerve. The site of the skin incision and skull opening are nearly the same for trigeminal neuralgia and hemifacial spasm. However, in hemifacial spasm, the facial nerve is exposed.

The risks of this operation are the same as those described in the section on vascular decompression operations for trigeminal neuralgia. The operation relieves the spasm permanently in the great majority of patients, however, as with trigeminal neuralgia, the problem may persist or recur in a few patients in spite of this form of treatment.

## NOTES

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