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Treating Trigeminal Neuralgia

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About 200,000 Americans suffer from a rare but excruciatingly painful problem called trigeminal neuralgia (TN). This syndrome occurs most often when a blood vessel at the base of the brain presses against the trigeminal nerve and causes a “short circuit,” resulting in severe intermittent facial pain. Medications—including anticonvulsants, muscle relaxants and tricyclic antidepressants—will relieve the pain in about 75% of patients. (*Pollock BE et al. 2010*)

But for the remaining 25% of TN patients, medications either will not sufficiently relieve the pain or they will cause intolerable side effects. Efficacy of medical therapy also generally decreases over time even for patients who find initial relief.

One of the most important roles of a **primary care physician, dentist and oral surgeon** comes in the diagnostic stage. While trigeminal neuralgia can be easily diagnosed in just minutes with a few simple questions, we still see a significant number of patients who have had teeth extracted with no relief. It's critical for primary care physicians and dentists to recognize this stereotypical description of facial pain.

Once a patient has been diagnosed and scanned (*see box on page 3*), medical therapy is almost always the first line of treatment. However, TN pain may be refractory to all medicines or the side effects of the medicines are intolerable. In these cases, the patient should consider surgical options.

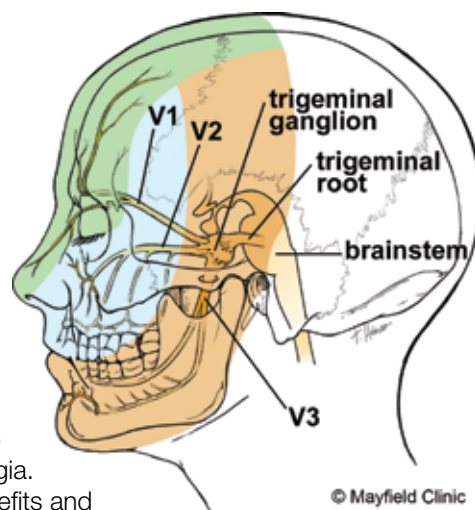
Patients often rely on their primary care physicians or treating neurologists to help guide them through the decision to seek a surgical solution as well as to choose the surgery that best suits their

individual situations.

Approximately 8,000 TN patients undergo surgery each year in the United States at an estimated cost of \$100 million.

At the current time, there are three types of procedures used to treat trigeminal neuralgia.

Each surgery has benefits and drawbacks. *It is important for primary care physicians and dentists to refer to a neurosurgery practice that has broad experience with TN and with all types of procedures, so that a patient can choose the most appropriate treatment.*



The three procedures include:

1. Radiosurgery (Gamma Knife®/CyberKnife®)

This treatment uses focused beams of radiation to damage the trigeminal nerve in order to stop it from sending pain signals to the brain.

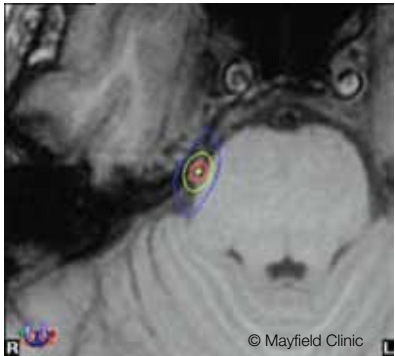
- ▶ **Outcomes:** 80–85% cure with at least 25% recurrence (*Verheul JB et al. 2010. Sheehan J. et al. 2005*)
- ▶ **Benefits:** Outpatient, noninvasive procedure; no anesthesia; virtually no risk or recovery time, with only a 2% chance of permanent numbness
- ▶ **Drawbacks:** Delayed pain relief, up to a month or more, but typically within one week; slightly lower success rate than other surgical therapies

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Trigeminal Neuralgia

- ▶ **Ideal Candidate:** Most patients with TN, in particular, those with relatively good but not great control who are willing to undergo a very low-impact procedure without any recovery time to lessen their pain, side effects or need for medication



During radiosurgery, radiation damages the trigeminal nerve (highlighted area) to stop it from sending pain signals.

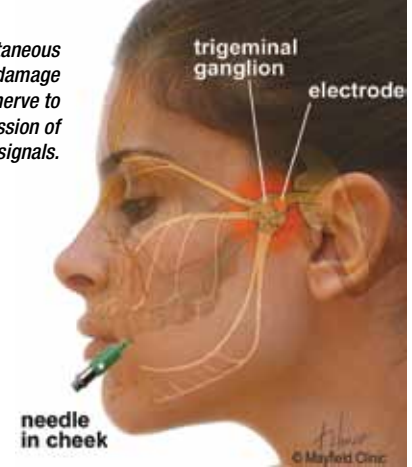
Diagnosing Trigeminal Neuralgia

TN is most likely to affect patients over the age of 50 and strikes more women than men. **TN is characterized by a sudden, severe, electric shock-like, stabbing pain that is typically felt on one side of the face.** Pain rarely occurs on both sides of the face. The attacks of pain, which generally last several seconds and may repeat in quick succession, come and go throughout the day. **These episodes can last for days, weeks or months at a time** and then disappear for months or years. Significant numbness or weakness does not occur with TN, although in the days before an episode begins, or after many years of ongoing breakthrough pain, some patients may experience a slight tingling or numbing sensation or a somewhat constant and aching pain.

The intense flashes of pain can be triggered by vibration or contact with the cheek, teeth brushing, eating, drinking, talking or being exposed to the wind. The bouts of pain rarely occur when the patient is sleeping. TN pain is never constant.

Once a diagnosis is made, patients should undergo an MRI scan to rule out a tumor pressing on the nerve, which occurs in about 3–5% of cases.

Percutaneous procedures damage the trigeminal nerve to block transmission of pain signals.



2. Percutaneous Rhizotomy

Guided by X-ray, the surgeon inserts a thin needle through the patient's cheek into the trigeminal nerve to damage it and stop it from transmitting pain signals to the "short circuit" and on to the brain. The surgeon can damage the nerve by injecting glycerol, burning it with radiofrequency energy or crushing it with a balloon.

With radiofrequency (PRR), control rates are higher and recurrence rates are lower than with the other needle-based procedures. Although the incidence of numbness is highest, surgeons use this needle method most often because, on balance, it has the most positive effects with the fewest drawbacks.

- ▶ **Outcomes:** 90–95% cure with 20–25% recurrence (*Taha JM et al. 1995*)
- ▶ **Benefits:** Outpatient procedure; local anesthesia; immediate relief
- ▶ **Drawbacks:** Creates facial numbness, with a 1% chance of severe facial numbness or burning pain called "anesthesia dolorosa"
- ▶ **Ideal Candidate:** Patients who have failed other methods; older patients with anesthesia risks who have such severe pain that they are not eating or drinking adequately

3. Microvascular Decompression

Available since the 1950s, microvascular decompression (MVD) is also sometimes referred to as posterior fossa exploration surgery. Often considered the "gold standard" in treatment, MVD is thought by many to be the only good surgical option for these patients. It involves making a small incision behind the ear and implanting a small felt pad between the blood vessels and the trigeminal nerve to alleviate the pressure and resulting "short circuit."

- ▶ **Outcomes:** 90–95% cure with 20–25% recurrence (*Pollock BE et al. 2010; Barker FG et al. 1996*)
- ▶ **Benefits:** Immediate relief; less than a 1% chance of serious complications (in the hands of a surgeon with significant experience); minimal risk of numbness
- ▶ **Drawbacks:** Inpatient surgery requiring general anesthesia, small surgical risks and a two-day stay

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Sources:

Pollock BE et al. Prospective comparison of posterior fossa exploration and stereotactic radiosurgery dorsal root entry zone target as primary surgery for patients with idiopathic trigeminal neuralgia. *Neurology*. 2010 Sept; 67(3): 633-8.

Verheul JB et al. Gamma knife® surgery for trigeminal neuralgia: a review of 450 consecutive cases. *Journal of Neurosurgery*. 2010 Dec; 113 Suppl: 160-7.

Sheehan J et al. Gamma knife® surgery for trigeminal neuralgia: outcomes and prognostic factors. *Journal of Neurosurgery*. 2005 Mar; 102(3): 434-41.

Taha JM et al. A prospective 15-year follow up of 154 consecutive patients with trigeminal neuralgia treated by percutaneous stereotactic radiofrequency thermal rhizotomy. *Journal of Neurosurgery*. 1995 Dec; 83(6): 989-93.

Pollock BE et al. A prospective cost-effectiveness study of trigeminal neuralgia surgery. *Clinical Journal of Pain*. 2005; Jul-Aug; 21 (4): 317-22.

Barker FG 2nd et al. The long-term outcome of microvascular decompression for trigeminal neuralgia. *New England Journal of Medicine*. 1996 Apr 25; 334(17): 1077-83.

Sekula RF Jr, et al. Microvascular decompression for elderly patients with trigeminal neuralgia: a prospective study and systematic review with meta-analysis. *Journal of Neurosurgery*. 2011 Jan; 114(1): 172-9. Epub 2010 Jul 23.

Huang CF et al. Microsurgical outcomes after failed repeated Gamma Knife® surgery for refractory trigeminal neuralgia. *Journal of Neurosurgery*. 2006 Dec; 105 Suppl: 117-9.

Pollack BE et al. Repeat radiosurgery for idiopathic trigeminal neuralgia. *International Journal of Radiation Oncology, Biology and Physics*. 2005 Jan 1; 61(1): 192-5.

Trigeminal Neuralgia

in the hospital, with around two weeks of recovery at home

► **Ideal Candidate:**

Many patients of all ages with limited anesthesia risk; MVD for TN is a safe procedure even in the elderly; the risk of serious morbidity or mortality is similar to that in younger patients (Sekula RF et al. 2011)



MVD surgery uses a pad to relieve pressure on the trigeminal nerve.

As shown in the descriptions above, there are risks and benefits of each procedure. It is critical that patients and their referring physicians are able to consider all options without bias, based on patient age, medical history and concern about complications associated with different surgical options.

Multiple Procedures

In cases of particularly intractable trigeminal neuralgia, multiple surgical treatments—which can be attempted in any order—may be necessary.

Although scarring from radiosurgery was once believed to prevent the use of other surgical techniques, it has since been found this is not the case. MVD is occasionally repeated, especially after long periods of relief; a Mayo Clinic study found that radiosurgery provided adequate pain relief to 80% of patients when it was repeated. (In other words, radiosurgery relieves pain in 80 out of 100 TN patients. If the remaining 20 patients were given a subsequent round of radiosurgery, 16 of those patients—or 80%—would gain relief.) PRR can be utilized multiple times. Occasionally, partial cutting of the nerve (partial sensory rhizotomy, or PSR) is necessary when multiple other attempts have failed. (Huang CF et al. 2006. Pollack BE et al. 2005)

South Denver Neurosurgery provides state-of-the-art diagnostic and treatment programs for a wide range of brain and spinal disorders. We partner with our patients and their physician teams to make individualized decisions and treatment plans. Our physicians are some of the most experienced in the Rocky Mountain region, offering the latest, most up-to-date procedures and treatment options to patients.

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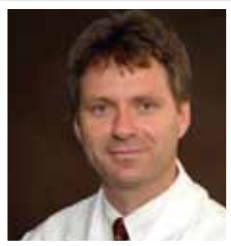
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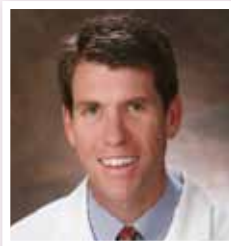
Meet our physicians



Ben Guiot, MD

Neurosurgeon, board-certified by the American Board of Neurological Surgeons and the Royal College of Physicians and Surgeons of Canada. Specializing in all aspects of spine care, including:

- ⌘ Minimally invasive spine surgery
- ⌘ Spinal deformity correction
- ⌘ Reconstruction of complex spinal disorders



J. Adair Prall, MD

Neurosurgeon, specializing in:

- ⌘ Trigeminal neuralgia
- ⌘ Spinal disorders
- ⌘ Neuro-oncology
- ⌘ Minimally invasive and motion-preserving spine surgery
- ⌘ Stereotactic radiosurgery (Gamma Knife® and CyberKnife®)



Mariel Szapiel, MD

Neurosurgeon, specializing in neuromodulation for chronic diseases, including:

- ⌘ Essential tremor
- ⌘ Dystonia
- ⌘ Parkinson's disease
- ⌘ Tourette's syndrome
- ⌘ Obsessive-compulsive disorder and other mood disorders
- ⌘ Chronic intractable headaches



David VanSickle, MD, PhD

Neurosurgeon, PhD in bioengineering, specializing in:

- ⌘ Deep brain stimulation (DBS) for Parkinson's and essential tremor
- ⌘ Epilepsy surgery
- ⌘ Neuro-oncology
- ⌘ Spinal cord stimulator implantation for pain
- ⌘ Transsphenoidal surgery (pituitary surgery)
- ⌘ Minimally invasive and motion-preserving spine surgery
- ⌘ Stereotactic radiosurgery (Gamma Knife® and CyberKnife®)