Percutaneous nucleotractotomy: what kind of pain does it treat and how does it work?

This procedure interrupts processing of pain signals from the face, mouth, tongue and throat. By targeting both the pain fibers and the nucleus (group of nerve cells that processes pain), it can address pain from a number of causes, such as nerve damage or tumor.

As they enter the brain, the sensory fibers from the face and oropharynx (mouth, tongue, gums, etc) travel downward to a specific group of nerve cells (nucleus caudalis) while other, non-pain fibers travel upwards. This difference in direction allows the pain fibers to be selectively targeted.

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Trigeminal Nucleotractomy (Facial Pain)

Center for the Relief of Pain

TREATMENT OPTIONS,
DIAGNOSIS-BASED,
ALWAYS, WITHOUT FAIL,
WITH THE PATIENT
AT THE CENTER

"The pain was excruciating, I couldn't live through it. I couldn't breath. I couldn't sleep. I couldn't eat. I don't remember the procedure but the pain was gone! I could breath again."

— Michael M.

Outcome and Risks

Nucleotractotomy is a very safe procedure and has a low incidence of complications but no procedure is completely safe.

Approximately 70% (2 out of 3) of patients enjoy significant pain relief with the procedure. Unfortunately, such pain relief cannot be guaranteed.

Complications are rare but can occur. Operating around the brainstem means that any kind of neurological injury is possible, including possible paralysis or problems with feeling, walking or balance. Because of the normal anatomy, there is a 10-15% risk of incoordination of the arm that may last for several months or even be permanent.

Percutaneous Procedure

Percutaneous nucleotractotomy (through a needle) is usually performed in the CT scanner. Prior to the procedure, the radiologist will perform a spinal tap and inject some dye into the spinal fluid to help see the spinal cord (a myelogram).

The patient is then brought to the CT scanner and either heavy sedation or general anesthesia is used. An area at the top of the back of the neck is cleaned and sterilely draped. A small spinal needle is inserted through the opening in the base of the skull (foramen magnum). An even smaller probe is placed through it into the brainstem in the area of the trigeminal tract (pain fibers) and nucleus caudalis (bundle of nerve cells). Correct positioning is identified using anatomy on the CT scan. The pain fibers and nerve cells are then "shut off" using a brief pulse of heat.

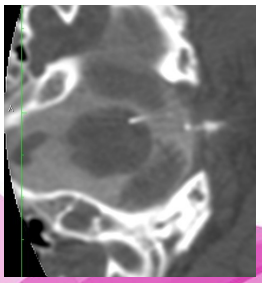
The procedure itself usually takes 30-60 minutes and can be done either as an inpatient or an outpatient.

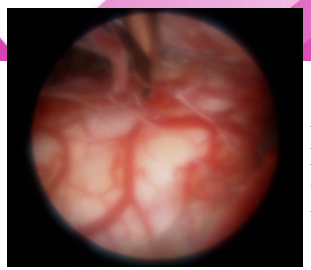
Cancer-related Pain

Nucleotractotomy can be a good option for pain related to cancer of the head, mouth or throat. Because it is performed through a needle, it is minimally invasive and well-tolerated, even with sicker patients. This approach can be used to treat pain associated with tumors of the mouth, tongue, throat, sinuses and face, often with improved nutrition, hydration and a better ability to participate in important treatments.

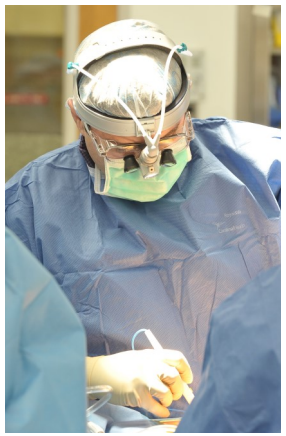
CT scan during percutaneous nucleotractotomy

The brainstem is in the center and dark compared to the light myelogram dye around it. The probe is coming in from the right and entering the brainstem, with the tip bright white. The nose is to the left and the back of the head to the right.





An endoscopic view of the probe (black, 12 o'clock) entering the brainstem through a needle (silver).



"It is easier to find men who will volunteer to die, than to find those who are willing to endure pain."

JUIUS CAESAR