



## **Dorsal Root Ganglion Stimulation**

### **What is a dorsal root ganglion?**

The dorsal root ganglion is a portion of each spinal nerve that is packed with sensory nerve cell bodies and fibers, to allow transmission of sensation from the body to the spinal cord and brain. The dorsal root ganglion for each spinal nerve is located in the intervertebral foramen, along each side of the spinal column. Each dorsal root ganglion is responsible for transmitting sensory signals, including pain, from a specific area of the body known as a dermatome. For example, the right L5 dermatome includes portions of the right thigh and leg, as well as the top of the right foot.

### **What is a dorsal root ganglion stimulator?**

A dorsal root ganglion stimulator is somewhat similar to a spinal cord stimulator, but it allows targeting more specific areas of pain. It also may allow targeting areas that can be difficult to target with a traditional spinal cord stimulator such as the hand, chest, abdomen, foot, knee, or groin. It involves a small device called a generator, similar to a pacemaker, that delivers small electrical impulses to the dorsal root ganglion through wires and leads that lie over the this structure. These impulses block pain signals from traveling through the dorsal root ganglion to the brain for processing. This effectively masks pain signals and prevents the patient from experiencing a portion of the pain. This can be an excellent way to treat very specific areas of chronic pain when other therapies have not been effective.

A dorsal root ganglion stimulator device has 3 main parts:

- A pulse generator with a battery that creates electrical pulses
- Lead wire(s) with electrodes that deliver electrical pulses to the dorsal root ganglion
- A remote control system to adjust the settings or turn the device on and off

### **How is a dorsal root ganglion stimulator placed?**

There are two stages for dorsal root ganglion stimulator placement. The first stage involves a temporary placement of the device to test its effectiveness for each patient. This is called a trial and is similar to a "test run." In the second stage, a more permanent device is placed in those patients who responded well to the trial. This stage is called permanent placement.

Both procedures are completed in a similar fashion. First, you'll lie on your stomach on an x-ray table and the doctor will numb the area with a local anesthetic. Then, using xray guidance, a needle

will be placed to access the epidural space. When in the correct position, trial leads are inserted in the epidural space and then positioned over the dorsal root ganglion.

During the trial, you will be asked questions during the procedure to determine if the device is in the correct location. Once the leads are in the correct position, a bandage is placed and the wires are connected to an external generator that will be worn on a belt for the next 4-7 days. You will then be sent to the recovery area to be monitored for a few hours.

### **How effective is dorsal root ganglion stimulation?**

One study of effectiveness of dorsal root ganglion stimulation have shown that in properly selected patients, 70-80% of patients continue to experience very good pain relief after 1 year of device implantation.<sup>1</sup>

### **What are the risks?**

The risk of complication from dorsal root ganglion stimulator placement are low. However, there could be bruising, soreness, and postoperative pain at the surgical site. Serious complications, including infection, hemorrhage, nerve root compression leading to paralysis, or cerebrospinal fluid leak are rare. Some patients experience persistent pain at the electrode or stimulator site, generator migration and/or local skin irritation, or lead migration which can result in reduction in pain relief and re-operation.

### **What happens after the procedure?**

You will wake up in the recovery area where you are closely monitored for a few hours. Most patients will be drowsy from the pain medications given during the procedure. The external generator will be programmed before you leave, and it will be worn on a belt for the next 4-7 days. You will be sent home with specific instructions on how to control the device. After this time, you will return to your doctor's office for removal of the temporary leads, and for discussion of effectiveness of the trial.

If the trial produces good pain relief and functional improvement, the second stage can be completed. The permanent placement involves a similar procedure to place leads in the epidural space and over the dorsal root ganglion, but wires are tunneled under the skin and attached to a

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<sup>1</sup> Vuka I, Marcijuš T, Došenović S, et al. Neuromodulation with electrical field stimulation of dorsal root ganglion in various pain syndromes: a systematic review with focus on participant selection. *J Pain Res.* 2019;12:803–830. Published 2019 Feb 27. doi:10.2147/JPR.S168814

generator that will be inserted under the skin in the back or flank region. This allows for long term use of the dorsal root ganglion stimulator.

### **Is a dorsal root ganglion stimulator trial right for you?**

Dorsal root ganglion stimulator placement can be effective for patients who have failed more conservative means to control pain, such as medication, injections, physical therapy, and traditional spinal cord stimulation. This procedure has been studied and shown to be effective in patients with:

- Severe neuropathic pain of the trunk and limbs resulting from damage to peripheral nerves
- Complex regional pain syndrome
- Phantom limb/stump pain
- Arachnoiditis
- Peripheral neuropathy

Dorsal root ganglion stimulator therapy is reversible. If a patient decides at any time to discontinue treatment, the electrodes, generator, and wires can all be removed.