Neurostimulation

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Neurostimulation is the stimulation of the spinal chord by small electrical impulses that block the transmission of pain messages to the brain. The low voltage stimulation causes the individual to feel a mild tingling sensation referred to as paresthesia.

Neurostimulation aims to treat, not cure, chronic pain conditions such as Failed Back Syndrome (FBS) and Complex Regional Pain Syndrome (CRPS). It is a direct approach to treating pain at the source and can be very effective. Neurostimulation is more effective on patients who experience chronic intractable pain of the trunk or limbs.

Neurostimulation Systems are composed of the following components: an integrated circuit, radio wave transceiver, power source, connector block, neurostimulator, lead(s), extension, patient programmer and control magnet. The neurostimulator is an implantable, pacemaker sized, device that sends the electrical stimulation through the lead to the electrodes implanted near the spinal cord or affected peripheral nerve.

There are two types of neurostimulation systems which differ by location of the power source. One system is fully implanted with an internal power source beneath the skin. The second system has a power source externally and a small antenna placed on the skin with an adhesive patch to receive the stimulation. Individuals with the fully implanted system must undergo surgery to replace the worn out power supply periodically.

Patients must meet certain criteria in order to be considered for the implantation of a neurostimulation system. A patient may only be considered if more conservative therapies have failed. Additionally, each individual must undergo multiple tests and evaluations before advancing to a screening test period. During the screening test period, an individual is able to experience the effects of a neurostimulation system without undergoing invasive surgery. The first stage involved an interactive stimulation period in the operating room, which the patient is conscious for. Following the interactive stimulation is a 5 -7 day trial period with the neurostimulation system. If a patient is satisfied with the efficiency of the system, the complete neurostimulation system is implanted; if not, the temporary screening lead is removed and the patient is advised to research other forms of treatment.

Before the system is completely implanted, the patient must determine which neurostimulation system he or she finds more accommodating in addition to the location of the neurostimulator near the abdomen. The surgeon then identifies the vertebral intervals before inserting the needle at the appropriate spinal location. Next, the lead is induced through the needle as the lead tip is advanced to the corresponding spinal location. The lead is connected to an external cable where the effects of the stimulation are tested. The lead is then anchored and the surgeon proceeds with the implantation of the neurostimulator. A subcutaneous pocket is created and the extension is passed through a tunnel and connected to the lead. The other end of the extension is connected to the neurostimulator. Finally, the system operation is verified with the programmer and the incision is closed.

The cost of a neurostimulation system is about $40,000; however, individuals save, on average, $30,000 a year in reduced health care costs. Patients should expect a fifty percent reduction in back, leg and arm pain; however, break through pain is normal. Neurostimulation aims to reduce pain rather than eliminate it.

References:

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