

# Cancer Pain and Neuromodulation

*Potential for Improved Quality of Life*

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People are living longer after a cancer diagnosis and may experience pain either as a result of the original malignancy, or its treatment. However, the practice of pain medicine is progressing and can help reduce to the burden of suffering from cancer-associated pain. Not only can attending to pain bring relief, it can also impact overall wellness and resiliency.

## Pain has many forms

Pain is multi-faceted. For instance, it can be described as being based in bone or in nerves, or as diffuse, based, for instance, in organs. Medical terms for different types of pain include nociceptive (stemming from the bones or soft tissue), neuropathic (based in nerves, such as from nerve compression or damage), and sympathetic (involving organs and body cavities). Physical complaints can co-exist with psychological or spiritual pain, which result from the normal grieving process that is experienced during diagnosis, treatment and progression. Even if the cancer is in remission, a patient may continue to suffer psychological and spiritual consequences of the fight. Patients and health care providers continue to accept pain as a normal consequence of cancer and minimize its impact on overall health and survival.

Poorly treated pain has long-term consequences. The body produces adrenaline in response to persistent pain. Adrenaline reduces blood flow to the extremities, raises blood pressure, increases anxiety and impairs sleep. Adrenaline causes the release of stress hormones that reduce appetite, and decrease immune function. Cells that normally police the body for abnormal cells become dysfunctional and are unable to clean up defective cancer cells. Sleep deprivation, anxiety, and weight loss contribute to functional decline. Survival is threatened because of

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## Physical complaints can co-exist with psychological or spiritual pain

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the physical deterioration associated with uncontrolled pain.

All types of pain are usually controlled with conservative treatment with medications and other methods such as meditation, distraction and breathing techniques. Other methods such as acupuncture, massage, and exercise work synergistically to reduce pain. For some patients despite aggressive treatment, pain remains uncontrolled. For others, the side effects from pain medication impact function and quality of life. For these patients, the use of interventional techniques to control pain is appropriate.

## Interventions for cancer pain

Interventional techniques to control cancer-associated pain include surgical debulking, injection therapy, bony tumor stabilization, nerve destruction, and pain-signal modulation with electrical stimulation and implanted drug delivery devices. Injection therapy typically delivers local anesthetic and corticosteroids to decrease local inflammation and turn off

the pain short term. These therapies are useful for pain related to tumors that are expected to be short term. Bony tumor stabilization is preformed surgically or through a needle that delivers cement to the bone. Neural destruction is performed surgically by directly cutting the nerves or by an injection of a caustic chemical to kill the nerve. Chemical destruction is used for patients with end-stage disease. Pain often returns after six months and the procedure may be repeated but may not be as effective as the first treatment.

Implantable devices address resistant pain by changing the electrical signals of pain received by the brain. Electrical stimulation treats an area affected by nerve pain. It particularly is useful for painful neuropathies associated with radiation, surgery or chemotherapy. Small electrodes are implanted in the spine or along the peripheral nerves and connected to a pulse generator. Current pulses through the electrodes to produce a sensation of vibration in the area of pain. This sensation overrides the pain signal and thereby reduces pain recognition by the brain. The generator is programmed by the clinician with several programs to provide pain relief. The signal intensity and frequency are adjusted as needed by the patient to fine-tune pain relief. Stimulation improves pain without impacting cognitive and bowel function, thereby improving quality of life.

Drug delivery devices infuse pain medication into the spine. Delivering medications directly to the spinal cord results in improved pain relief with fewer side effects of opioids. Patients have reported decreased fatigue, constipation, and decreased mental-status changes with this therapy. Adjuvant medications such local anesthetics (numbing medication) are utilized to control nerve and sympathetic pain. Patients report decreased constipation, improved appetite and mental function. The pumps may be programmed or medications changed to optimize pain relief and minimize side effects. Depending on the device implanted, patients may be able to deliver extra medication to relieve breakthrough pain with boosts of medication programmed by their healthcare provider.

### **Pain treatment to improve quality of life**

Under-treated pain associated with cancer diminishes quality of life and intensifies the suffering of patients and their families. In patients whose pain is not adequately controlled with traditional measures or who suffer from side effects of medications, these implantable devices allow patients to return to an improved quality of life and greater independence.

**Please note:** *This information should not be used as a substitute for medical treatment and advice. Always consult a medical professional about any health-related questions or concerns.*

### **Resources**

**American Cancer Society**  
250 Williams Street NW  
Atlanta, Georgia, 30303  
1-800-227-2345  
[www.cancer.org](http://www.cancer.org)

**National Cancer Institute**  
BG 9609 MSC 9760  
9609 Medical Center Drive  
Bethesda, MD 20892-9760  
1-800-422-6237  
<http://www.cancer.gov/cancertopics/coping>