



## **ELE 382 Biomedical Engineering Seminar II, November 27, 2000**

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### **What Is Chronic Pain??**

Chronic pain is when the pain lasts for a long time, typically more than six months. It could be the results for a previously healed injury, or from an ongoing cause, such as cancer, arthritis, nerve damage, or chronic infection.

### **Advanced Pain Therapies (APT™)**

APT are proven, effective alternatives to back surgery, drug or other therapies. Provides excellent pain relief by working directly on the spinal cord.

### **APT Neurostimulation**

APT Neurostimulation includes both spinal cord and peripheral nerve stimulation. It's uses a small neurostimulation system that is surgically placed in the abdomen, just under the skin. The lead(s) run up to the spinal cord and/or to the specific "problem" nerve. Electrical impulses block the signal of pain from reaching the brain; therefore it is not felt. Typically there is a 50% - 70% reduction in pain.

There are two types of neurostimulators; Totally Implantable System and Radio Frequency System. The major difference between the two is the Totally Implantable System uses a battery that is placed under the skin.

The Radio Frequency System includes an external transmitter, antenna, implanted receiver, and an extension with

lead(s). The external transmitter sends radio signals to the receiver, which contains no batteries, then to the lead(s). The external transmitter is the power source of the system, powered by 9-volt batteries. The antenna is placed over the skin above the receiver and taped during operation.

The Totally Implantable System includes a pulse generator, a patient programmer, and an extension with lead(s). The pulse generation is placed in the same place. It sends electrical pulses to the spinal cord where it blocks the pain signals. The patient programmer allows the patient to control his/her own settings, by use of radio waves.

### **APT Intrathecal**

APT Intrathecal is comprised of a pump and a catheter. The pump is place just under the skin of the abdomen. A surgically place catheter delivers morphine directly to the intrathecal space. This blocks the pain signals. Since the medication goes directly to the spinal cord, there is less required. It has a reservoir where it holds the medication, which can be refilled with a syringe into the "fill port". It automatically delivers a controlled amount of the medication. Some of the pumps have a side catheter, which allows the injection of other medications directly into the catheter, bypassing the pump.

