

## **WHAT IS AN EMG/NCS STUDY AND IT'S DIAGNOSTIC PURPOSE ?**

An **electromyogram** (EMG) is a diagnostic study that has been used by health care providers for over 50 years. An EMG provides information about the integrity of the muscles and the nerves in your body. An EMG examination is typically ordered by a physician to evaluate for muscle or nerve damage as part of a medical workup. An EMG tells you how muscle and nerve function. This can be helpful when correlating findings of an MRI which gives you an anatomic picture of what the spine looks like.

Using a computer, monitor, amplifier, loudspeaker, stimulator and high tech filters the examiner actually sees and hears how your muscles and nerves are working. As part of the EMG a very small acupuncture size probe is inserted into various muscles in the arm, leg, neck or back where you are having symptoms. In many cases the examination will include areas far from where you are having symptoms because nerves can be very long.

An EMG is only one part of nerve testing; another part is called the nerve conduction study.

A **nerve conduction study** (NCS) is one part of a comprehensive nerve and muscle diagnostic test. Like an EMG, a NCS is typically ordered by a physician to evaluate for muscle or nerve damage as part of a medical workup. Once again, the examiner uses a computer, monitor, amplifier, loudspeaker, stimulator and high tech filters to monitor the functioning nerves and muscles your body.

The examiner places small electrodes on your skin over muscles being tested in your arms or legs. The examiner then uses a stimulator to deliver a very small electrical current to your skin near nerves being tested, causing your nerves to fire. The electrical signals produced by nerves and muscles are picked up by the computer, and the information is interpreted by a physician specially trained in electrodiagnostic medicine. The stimulator only produces a very small shock that does not cause damage to your body. Many different motor and sensory nerves are typically evaluated. Clean and sterile equipment are used on each examination and discarded after the test is completed. There is virtually no chance to catch any diseases from having an EMG.

When you go to your health care provider with symptoms including radicular pain (pain radiating from the neck or back), numbness, weakness or tingling in an arm or leg, it is important to find out what is causing your symptoms. There are many possible causes for the above symptoms, and many cases resolve spontaneously on their own. However, if symptoms persist, an EMG/NCS is one way to assess muscle and nerve function and is often used with other tests such as MRI or CT scan that create images of the body.

### **What Can EMG/NCS Detect?**

The EMG/NCS examines nerves from just outside the spinal cord to the skin. Nerves have long projections called axons that carry electrical signals. Axons are surrounded by supporting cells called schwann cells, which produce myelin. Myelin acts like an insulator for the axons and makes nerve signals travel faster.

In addition, because nerves go into muscles and give signals to muscles causing muscle contraction, the EMG/NCS also tests muscles. Abnormalities with the peripheral nervous system (all nerve tissue outside the brain and spinal cord), including the insulating myelin and muscles, can all be evaluated with EMG/NCS. EMG/NCS can detect many different problems with nerves or muscles such as: Pinched nerve (cervical or lumbar radiculopathy), entrapped nerve (carpal tunnel syndrome, cubital tunnel syndrome, tarsal tunnel syndrome) and abnormal axonal or myelin related disorders (peripheral neuropathy) and spasm in a muscle.

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