

## Electromyography: A Patient's Guide

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If you have numbness, tingling, radiating pain, muscle weakness or difficult with coordination, your doctor may refer you for an "Electromyography study," commonly referred to as an EMG Study. This study is used to diagnose common conditions such as radiculopathy ("pinched nerve"), spinal stenosis, or peripheral nerve damage or compression (i.e. Carpal tunnel syndrome), or less commonly neuromuscular disorders. There are two parts to an Electromyographic study: the *Nerve Conduction Study* and the *EMG study*.

### Nerve Conduction Study (NCS):

**THEORY:** Nerves are somewhat akin to electrical wire, as they transmit signals from the brain and spinal cord to the peripheral skeletal muscles. The speed and number of nerve fibers are evaluated in this section of the test.

**WHAT TO EXPECT:** The doctor who is performing the study will first make marks with measurements and landmarks on your skin which can be easily removed later with soap and water. A recording electrode, made of a small metal disk or sticker, is placed on your fingers or foot. A stimulator is placed at the measured mark and when activated, the recorder displays an image on the computer screen. The waveform is then analyzed for its speed and shape.

Most patients do not find this portion of the test uncomfortable. The activation of the stimulator has been likened to the feeling of static electricity as when a person rubs his feet on a carpet and then touches another person. If pain is experienced, it will not be continuous and will last a very short time, less than a second. More importantly, the applied electric stimulus has never been found to cause any nerve or muscle damage.

### EMG:

**THEORY:** Normal muscle has certain characteristic sounds and waveforms when it is at rest and when it is being activated.

**WHAT TO EXPECT:** A small pin, akin to an acupuncture needle, is placed into your muscle and the examiner listens to the sounds of that muscle at rest and during activation of the muscle, as well as sees a waveform on a monitor called an oscilloscope. Therefore, the first aspect of this section asks the patient to relax as the physician places the pin into different parts of the muscle, sampling different sections for normal or abnormal activity. You will hear the spontaneous activity of the muscle as a "pop" and "snap" sound, much like popcorn in the microwave. In the second part of the test, you will be asked to contract the muscle, for example, by bending or lifting your hand or leg. The examiner will observe the action potential (the frequency, the shape, and timed response of the motor unit) on the monitor and this will provide information on how the nerves and muscles are working together. Multiple muscles are examined for proper diagnostic information to be collected.

Most patients do not find this portion of the test painful, but it may be slightly uncomfortable. In most cases, the pin placement into your muscle will not cause bleeding. However, just as immunizations or a

medication shot can cause bleeding, it can be controlled with pressure from the physician's hand and cotton pad. Similarly as with the NCS, this part of the test has never been found to cause any nerve or muscle damage. Disposable needles are used for each new patient and are immediately disposed of following use, so there is no risk of contracting an infection from another person.

**OTHER HELPFUL INFORMATION:**

- 1) Avoid applying any creams or oils prior to coming to your appointment. It is important that the skin is cleaned with soap and water, free from lotions, in order to maximize adherence of the electrodes to the skin.
- 2) If you feel that you may be sensitive to the pain, you can take a Tylenol, anti-inflammatory, or any other pain pill that your doctor has already prescribed to you prior to the appointment, as such medication will not affect the efficacy of the test. Just be sure to have someone drive you, as the pain pill may impair your sensorium.
- 3) If you are on anticoagulation or blood thinners or if you have a pacemaker or implanted defibrillators, you should notify the physician performing the test, but generally this is not a contraindication. If you have a joint replacement or other artificial components in your body, you do not need to take antibiotics specifically for the EMG. You ought take your usual medication on the day of the test. No special preparation is necessary.
- 4) If for any reason you feel that you cannot continue with the study, do not hesitate to tell the examiner to stop. If you have tolerated at least some of the test, then that information may still provide valuable information for the examiner.
- 5) Depending on the diagnosis in question, the exam typically takes anywhere from 30 to 60 minutes, depending on the condition being tested and the findings of the study. A report that includes the results and an interpretation will be sent to your doctor.

If you have any other questions, please ask your doctors *OR*, ask any of the D.I.S.C. Physicians.

Help websites:

<http://www.aanem.org>