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## Electromyography

Electromyography (EMG) is a test that checks the health of the muscles and the nerves that control the muscles.

### How the Test is Performed

Your health care provider inserts a very thin needle electrode through your skin into one of your muscles. The electrode on the needle picks up the electrical activity given off by your muscles. This activity appears on a nearby monitor and may be heard through a speaker.

After placement of the electrodes, you may be asked to contract the muscle. For example, by bending your arm. The electrical activity seen on the monitor provides information about your muscle's ability to respond when the nerves to your muscles are stimulated.

A nerve conduction velocity test is almost always performed during the same visit as an EMG. The velocity test is done to see how fast and strong electrical signals move through a nerve.

### How to Prepare for the Test

No special preparation is usually necessary. Avoid using any creams or lotions on the day of the test.

Body temperature can affect the results of this test. If it is extremely cold outside, you may be told to wait in a warm room for a while before the test is performed.

If you are taking blood thinners or anticoagulants, inform the provider performing the test before it is done.

### How the Test will Feel

You may feel some pain or discomfort when the needles are inserted. But most people are able to complete the test without problems.

Afterward, the muscle may feel tender or bruised for a few days.

### Why the Test is Performed

EMG is most often used when a person has symptoms of weakness, pain, or abnormal sensation. It can help tell the difference between muscle weakness caused by the injury of a nerve attached to a muscle, and weakness due to a muscle or other nervous system disease.

## **Normal Results**

There is normally very little electrical activity in a muscle while at rest. Inserting the needles can cause some electrical activity, but once the muscles quiet down, there should be little electrical activity detected.

When you flex a muscle, activity begins to appear. As you contract your muscle more, the electrical activity increases and a pattern can be seen. This pattern helps your provider determine if the muscle is responding as it should.

## **What Abnormal Results Mean**

An EMG can detect problems with your muscles during rest or activity. Disorders or conditions that cause abnormal results include the following:

- Alcoholic neuropathy (damage to nerves from drinking too much alcohol)
- Amyotrophic lateral sclerosis (ALS; disease of the nerve cells in the brain and spinal cord that control muscle movement)
- Axillary nerve dysfunction (damage of the nerve that controls shoulder movement and sensation)
- Becker muscular dystrophy (muscle weakness of the legs and pelvis)
- Brachial plexopathy (problem affecting the set of nerves that leave the neck and enter the arm)
- Carpal tunnel syndrome (problem affecting the median nerve in the wrist and hand)
- Cubital tunnel syndrome (problem affecting the ulnar nerve in the elbow)
- Cervical spondylosis (neck pain from wear on the disks and bones of the neck)
- Common peroneal nerve dysfunction (damage of the peroneal nerve leading to loss of movement or sensation in the foot and leg)
- Denervation (reduced nerve stimulation of a muscle)
- Dermatomyositis (muscle disease that involves inflammation and a skin rash)
- Distal median nerve dysfunction (problem affecting the median nerve in the arm)
- Duchenne muscular dystrophy (inherited disease that involves muscle weakness)
- Facioscapulohumeral muscular dystrophy (Landouzy-Dejerine; disease of muscle weakness and loss of muscle tissue)
- Familial periodic paralysis (disorder that causes muscle weakness and sometimes a lower than normal level of potassium in the blood)
- Femoral nerve dysfunction (loss of movement or sensation in parts of the legs due to damage to the femoral nerve)
- Friedreich ataxia (inherited disease that affects areas in the brain and spinal cord that control coordination, muscle movement, and other functions)
- Guillain-Barré syndrome (autoimmune disorder of the nerves that leads to muscle weakness or paralysis)
- Lambert-Eaton syndrome (autoimmune disorder of the nerves that causes muscle weakness)
- Multiple mononeuropathy (a nervous system disorder that involves damage to at least 2 separate nerve areas)

- Mononeuropathy (damage to a single nerve that results in loss of movement, sensation, or other function of that nerve)
- Myopathy (muscle degeneration caused by a number of disorders, including muscular dystrophy)
- Myasthenia gravis (autoimmune disorder of the nerves that causes weakness of the voluntary muscles)
- Peripheral neuropathy (damage of nerves away from the brain and spinal cord)
- Polymyositis (muscle weakness, swelling, tenderness, and tissue damage of the skeletal muscles)
- Radial nerve dysfunction (damage of the radial nerve causing loss of movement or sensation in the back of the arm or hand)
- Radiculopathy (injury to nerve roots as they exit the spine most often in the neck or lower back)
- Sciatic nerve dysfunction (injury to or pressure on the sciatic nerve that causes weakness, numbness, or tingling in the leg)
- Sensorimotor polyneuropathy (condition that causes a decreased ability to move or feel because of nerve damage)
- Shy-Drager syndrome (nervous system disease that causes body-wide symptoms)
- Thyrotoxic periodic paralysis (muscle weakness from high levels of thyroid hormone)
- Tibial nerve dysfunction (damage of the tibial nerve causing loss of movement or sensation in the foot)

## Risks

Risks of this test include:

- Bleeding (minimal)
- Infection at the electrode sites (rare)

## Alternative Names

EMG; Myogram; Electromyogram

## References

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