Electrodiagnostic Studies (EMG/NCV)

Electromyography (EMG) and Nerve Conduction Velocity (NCV) studies are ordered to evaluate for injury or disease of muscle, nerve roots, and peripheral nerves. They test the condition of the nerves from the spine, face, and extremities, including the foot and hand. These studies are normally done together and are usually performed as a workup for complaints of pain, weakness, cramping, numbness, or tingling.

During the nerve conduction portion of the study, mild electrical impulses are sent along the course of a nerve in the arm or the leg. The electrical impulse may make the muscles in your arm and leg contract. The sensation you feel is much like that of a static electric shock. Electrodes are placed along the known course of the nerve. When the nerve is stimulated, it must transmit the signal along its course. An electrode placed further down the arm or leg captures the signal as it passes by. A healthy nerve will transmit the signal faster and stronger than a sick nerve.

The needle EMG portion of the study involves the insertion of very thin pin electrodes into the skin. The electrode is moved around slightly after its insertion. Muscles normally receive constant electrical signals from healthy nerves, and in return “broadcast” their own healthy electrical signals. Once inserted into a muscle, the EMG electrodes record the electrical signal generated by the muscle. If the muscle is diseased or injured, or if it does not receive adequate signals from its nerve supply, then the muscle signals that are broadcast back through the EMG electrode will show the abnormality.

Since the EMG and NCV study can be uncomfortable many patients come to the test anxious. Almost all leave feeling they worried for nothing. Equally important, many are grateful when the source of their pain, weakness, cramping or numbness has been found.