

ACUTE INJURIES: TIMING of EMG & NCS

Questions frequently arise concerning timing of EMG/NCS studies following an acute injury. Though it would seem appropriate to test the nerves and muscles of an injured patient in close proximity to an injury, certain physiologic phenomena dictate the need to delay a study following an injury. Different rules apply to the EMG and nerve conduction portions of the examination.

Surprisingly, following a complete nerve transection which results in the nerve being non-functional, nerve conduction values can be obtained for that nerve for up to seven days following the actual death of the nerve. Following that time, no response will be seen. As a result, nerve conduction studies are not valid if performed before that seven-day mark.

A different set of principles determines the appearance of acute changes seen on EMG. Acute changes which appear following a nerve injury are seen most commonly as fibrillations, increased insertional activity, or positive sharp waves in reporting.

Once again, using the example of a complete nerve transection which results in a nerve becoming nonfunctional and a muscle being paralyzed, acute changes are not seen when studying the non-functional muscle for approximately two-and-a-half weeks. As a result, needle EMG performed prior to the two-and-a-half week mark following an acute injury fails to reveal signs of an acute injury. A study performed after the two-and-a-half week mark reveals significant signs of denervation manifest by increased insertional activity, fibrillations, and positive sharp waves. As a result, a study performed before the two-and-a-half week mark would likely underestimate the degree of damage and, in some cases, might result in a normal needle exam.

Just remember, given the underlying physiology, following an acute injury, studies should be scheduled no sooner than two-and-a-half weeks following an injury.

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**ASK THE
MEDICAL ADVISORS**

Q: How long after an injury should an EMG & NCS be performed?

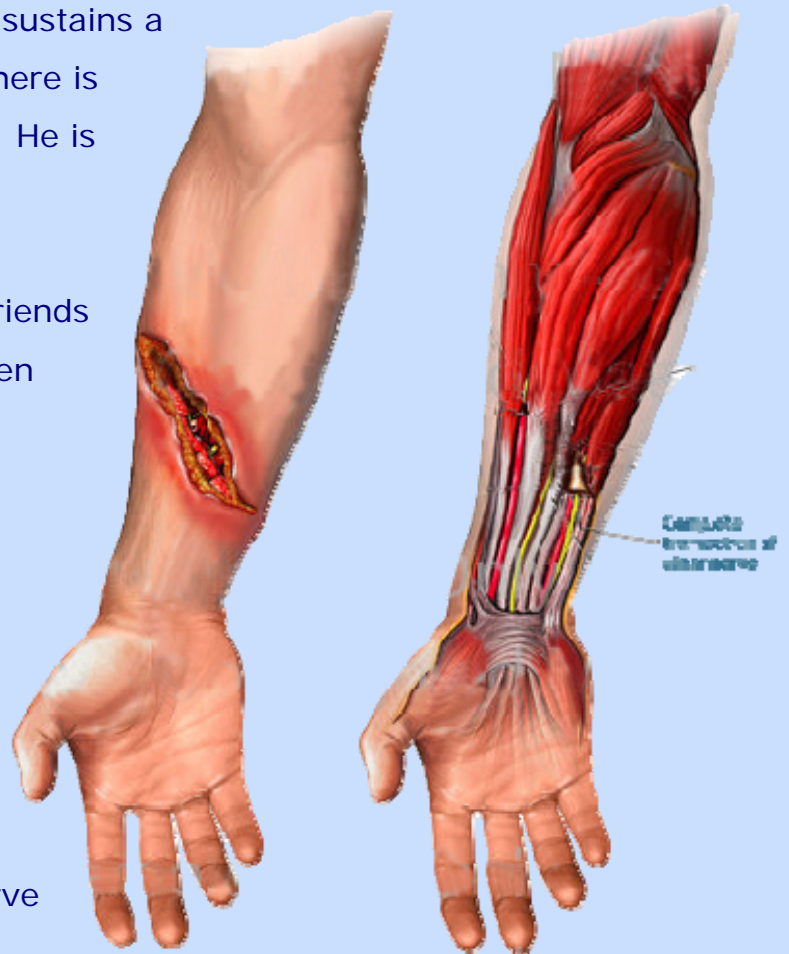
A: Injured nerves will appear normal if the study is done prematurely. If the nerves are damaged as a result of trauma, the effects will not appear for 17-21 days after the injury.

CASE STUDY

Transected Nerve

Mr. Jones is a 60-year old dockworker who sustains a serious fall badly lacerating his forearm. There is severe weakness in intrinsic hand muscles. He is sent to see Dr. X, a poorly trained electromyographer. Dr. X has an excellent reputation in the community. He is great friends with a number of local orthopedists and often takes them to his club and out on his boat.

Dr. X performs EMG and nerve conduction studies three days following the accident. He states that the nerve conduction are all normal though he does not appreciate any motor units under voluntary control in ulnar hand muscles. He tells the referring doctor that he doubts that the nerve is transected.



The patient undergoes physical therapy. No response is seen in several months of treatment. On his own, the patient obtains a second opinion and sees Dr. Y, a neurologist who has special training in EMG. Repeat EMG and nerve conduction studies reveal no evidence of ulnar function.

This patient underwent an attempt at surgical reattachment of the nerve at nine months following the injury. Because of the delay in diagnosing, a poor surgical result was seen. If the EMG had been appropriately performed at three weeks after the injury leading to surgical repair at four weeks, full functional recovery would have been seen.