

**ELECTROMYOGRAPHY AND**  
**NERVE CONDUCTION TESTING:**  
**WHEN TO ORDER;**  
**HOW TO INTERPRET**

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# **ELECTROMYOGRAPHY AND NERVE CONDUCTION TESTING**

**EMG/NCS Testing is a  
component of a complete  
neurodiagnostic consultation  
including history and a focused  
neurological examination.**

**Performing EMG and nerve conduction testing requires five simultaneous activities:**

**Machine Operation**

**Data Acquisition**

**Data scoring for internal consistency and clinical context**

**Interaction with patient to obtain relaxation and cooperation**

**Development of differential diagnoses and adjustment of testing in response to emerging data**

**EMG and nerve conduction testing is dynamic, like an arteriogram, without a predetermined protocol.**

**Emerging findings determine the direction the examination will take.**

**EMG and nerve conduction testing is not uniformly respected in the medical community because the quality of data and interpretation is extremely operator dependent.**

**The minimum qualifications for performing EMG/NCS testing are extremely low.**

**A physical therapist or technician with a few weeks' experience and little knowledge of anatomy or physiology can gather and report data.**

**For this reason, approximately 40% of the EMG/NCS testing I perform is to provide a second neurodiagnostic opinion.**

**Second opinion EMG/NCS testing is a particularly viable alternative in view of the over 60% decrease in reimbursement on January 1, 2013.**

# **When to Order EMG/Nerve Conduction Testing:**

**To determine the location and  
severity of entrapment  
neuropathy**

**To localize the source of sensory  
symptoms**

**To identify denervation associated with radicular symptoms reflecting the location and age of the lesion**

**To detect evidence of reinnervation, which precedes an increase in strength**

**To evaluate persistent  
symptomatology following  
surgical release procedures**

**To distinguish weakness related to a  
peripheral nerve or nerve root  
versus non-organic or the central  
nervous system**

## **Sources of Erroneous Nerve Conduction Interpretation:**

**A cold, unwarmed extremity slows  
nerve conduction.**

**An estimated or inaccurate limb  
measurement renders an  
incorrect nerve conduction  
velocity.**

**An unidentified polyneuropathy slows nerve conduction and diminishes action potential amplitude.**

**Patient obesity, perspiration, and body lotions degrade recording of potentials.**

**Patient lack of tolerance for electrical stimulation limits replication of pivotal sensory and motor action potentials.**

**Radiculopathies appear more significant distally, potentially obscuring diagnosis.**



**Needle examination of cervical or lumbar paraspinous musculature is normal in more than 99% of cases.**

**Distal denervation as a result of polyneuropathy may be erroneously diagnosed as bilateral radiculopathy.**

## **Approaches to Increase EMG/NCS Sensitivity and Specificity:**

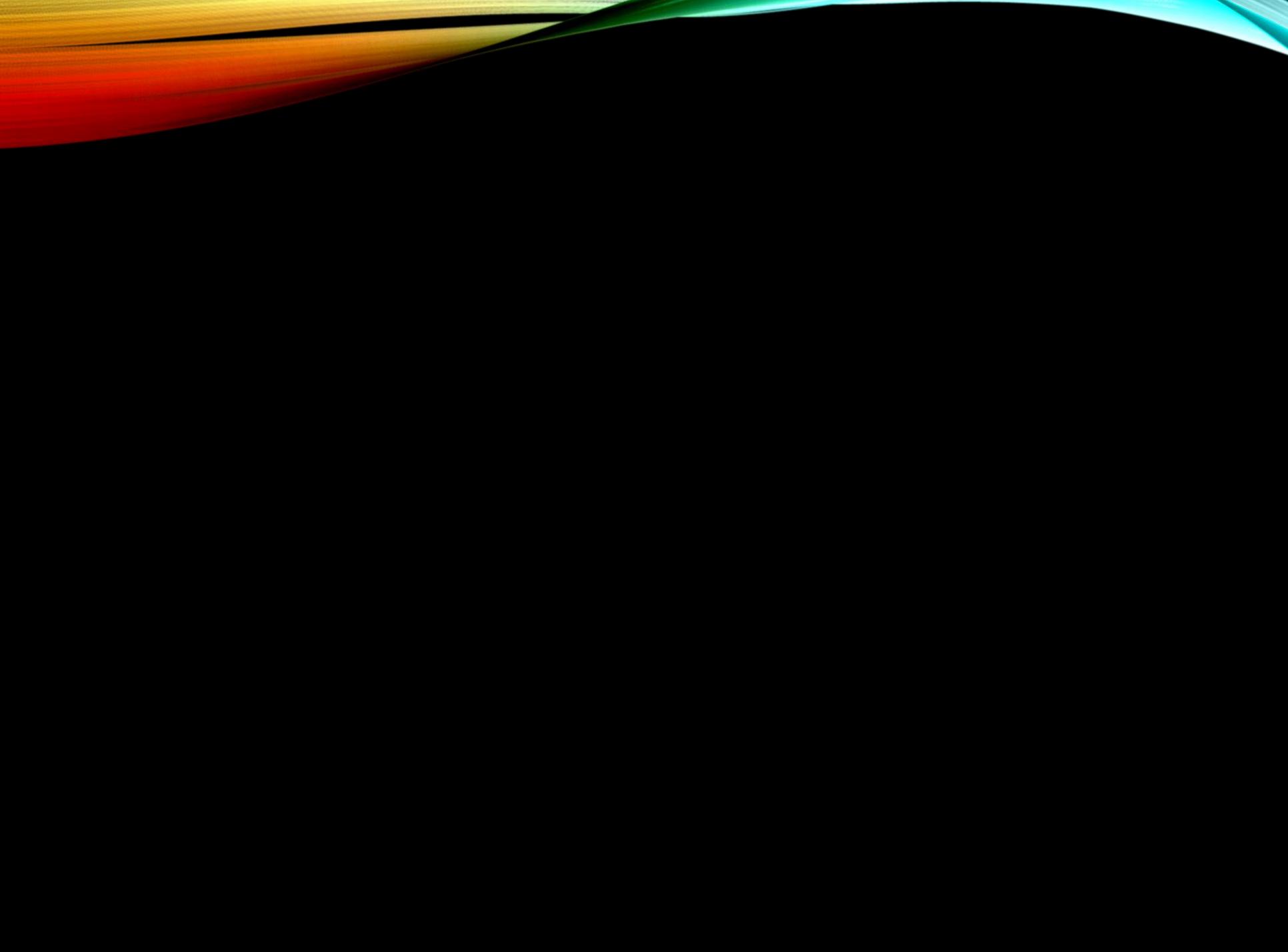
**Accurate diagnosis requires examiner training, experience, and motivation as well as quality instrumentation.**

**“Special carpal tunnel studies”  
involving comparison of median  
sensory and motor nerves to the  
patient’s own ulnar and radial  
nerves corrects for diminished  
limb temperature,  
polyneuropathy, and other  
patient-specific sources of error.**

**Testing radial sensory and motor nerves, which are rarely entrapped, provides early indication of polyneuropathy which will otherwise contribute to erroneous diagnosis.**

**Bilateral comparison of the arms and particularly the legs increases diagnostic accuracy.**

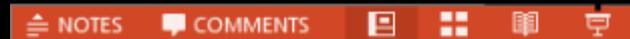
**In general, the more complete the EMG and NCS battery of testing is, the more certain the diagnoses will be.**



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