



## **Electrodiagnostic Findings in 108 Consecutive Patients Referred to a Post-Polio Clinic**

### **The Value of Routine Electrodiagnostic Studies**

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Many patients with a history of polio develop new symptoms including weakness, pain, fatigue, and changes in function, or post-polio syndrome (PPS).<sup>[1]</sup> Before a diagnosis of PPS is made, other diagnoses must first be ruled out. Assessment must be done in a comprehensive and coordinated manner.<sup>[2]</sup> Therefore, as part of our routine evaluation, we do an electromyogram/nerve conduction study (EMG/NCS) on every patient. During examinations on our clinic patients we began to notice (1) electrodiagnostic evidence of polio in limbs not previously felt to be involved; (2) a normal EMG, or evidence of another disease; and (3) EMG evidence consistent with additional neurological lesions, including compression neuropathies, peripheral neuropathies, and radiculopathies. A prospective study using a routine, standardized four-extremity electrodiagnostic protocol was done to quantify the frequency of these occurrences.

## METHODS

We studied 108 consecutive patients referred to our post-polio clinic. We performed a comprehensive history and physical examination, and then did an EMG/NCS on all patients, using bilateral median and ulnar sensory nerve conduction studies; four-extremity needle EMG of three muscles on each extremity; appropriate paraspinal and additional limb muscles; and other appropriate nerve conduction studies.

## RESULTS

Of the 108 patients, we found only 100 actually had had polio (92%). Of these, 49 patients had subclinical polio. The frequency and distribution with which it occurred is demonstrated in [TABLE 1](#). [TABLE 2](#) summarizes the additional abnormal neurological findings. Forty-nine percent of the patients had an abnormal peripheral nerve study. Carpal tunnel syndrome (CTS), either alone or in conjunction with an ulnar nerve neuropathy, was the most frequent finding, in a total of 38% of all patients.

**TABLE 1.** Frequency of Subclinical Polio in 100 Consecutive Post-Polio Patients

| Number of Limbs involved per Patient | Patients (N) | Total Number of Limbs |
|--------------------------------------|--------------|-----------------------|
| 1                                    | 23           | 23                    |
| 2                                    | 20           | 40                    |
| 3                                    | 4            | 12                    |
| 4                                    | 2            | 8                     |
| Total                                | 49           | 83                    |

**TABLE 2.** Additional Electrodiagnostic Findings in 100 Consecutive Post-Polio Patients

| Finding                       | Patients (N) | Percent |
|-------------------------------|--------------|---------|
| Carpal tunnel syndrome (CTS)  | 35           | 35      |
| Ulnar neuropathy at the wrist | 2            | 2       |
| CTS and ulnar neuropathy      | 3            | 3       |
| Peripheral neuropathy         | 3            | 3       |
| Brachial plexopathy           | 1            | 1       |
| Tibial neuropathy             | 1            | 1       |
| Radiculopathy                 | 4            | 4       |
| Total                         | 49           | 49      |

## DISCUSSION

Bromberg and Waring performed electrodiagnostic studies in a group of patients seen in their clinic, and found that 9% had normal EMGs, or borderline normal EMGs.<sup>[3]</sup> Other authors have found EMG evidence of old anterior horn cell disease in extremities thought to be uninvolved.<sup>[4-6]</sup> The reason for this high prevalence of subclinical polio is related to the ability of the neuromuscular system to function and reinnervate even when many anterior horn cells are lost. The long-term effect of this, however, is that progressive and unexpected weakness may develop in those "nonaffected" extremities. Additional electrodiagnostic findings including CTS and ulnar nerve neuropathy have been reported to be prevalent in post-polio patients.<sup>[7,8]</sup> Werner et al.<sup>[7]</sup> demonstrated that assistive device use is a major risk factor, and we also found that duration of use and severity of polio were additional considerations.<sup>[8]</sup>

## CONCLUSION

Our findings strongly support the value of a standardized four-extremity EMG/NCS as an adjuvant to a comprehensive history and physical examination. It helps to differentiate between old polio and other neurological diagnoses. There is a high prevalence of subclinical polio, which is important to know about in order to give proper recommendations regarding rest and activity. Given the frequency of risk factors for development of potentially treatable neurological lesions like CTS, early detection is valuable. We believe routine electrodiagnostic testing is essential for proper evaluation and management of the post-polio patient.

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