

## Clinical predictors of electromyographic findings of remote polio in unaffected limbs of adults with a history of acute paralytic poliomyelitis

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As part of the discussion at the Ninth International Post-Polio Health and Ventilator-Assisted Living Conference: Strategies for Living Well (Saint Louis, 2005) about exercise and overuse of muscles by polio survivors, Chanda Mayo-Ford, MD, presented her senior research project completed at National Rehabilitation Hospital (NRH) under the direction of Lauro S. Halstead, MD.

The statistics from the study show nerve damage in 40.5% of limbs that polio survivors regarded as “unaffected.”

The question and answer discussion indicated that improved testing with macro or single fiber EMG would probably reveal that an even larger percentage of unaffected limbs would show nerve damage from subclinical (not diagnosed) polio.

Consequently, medical practitioners treating polio survivors, and survivors themselves, should take into account subclinical polio nerve damage in an unaffected limb. When an EMG study is unavailable, Dr. Mayo-Ford’s study concludes that the best tool to use in assessing if an unaffected limb has polio damage is the manual muscle test, evaluating for weakness and atrophy.

### PURPOSE

To determine clinical predictors which could be used by physicians and physical therapists in developing exercise programs for polio survivors.

Previous EMG studies had shown that 21%\* to 29%\*\* of unaffected limbs had subclinical polio, but did not describe any clinical predictors.

An unaffected limb is defined as one that the survivor has identified as not weakened or paralyzed during the acute phase of polio.

The study hypothesizes four risk factors that would alert a physician

or physical therapist treating a polio survivor to the possibility of nerve damage in an unaffected limb:

- New weakness
- New pain
- Atrophy
- Muscle weakness as determined by manual muscle testing.

### METHOD

All participants were polio survivors with at least one limb they considered unaffected by the initial polio attack.

All participants had clinical evidence of polio in at least one limb.

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All participants were seen in one post-polio clinic (NRH).

The participants' charts (which came from diverse physicians) were studied retrospectively.

A comprehensive evaluation of each participant was performed.

A monopolar EMG was performed by the same physician in at least three muscle groups for each participant.

### RESULTS

55 participants with 111 unaffected limbs met the study criteria.

Age ranged from 22 to 88 years.

Polio onset ranged from two months to 29 years.

45 limbs (40.5%) had subclinical polio on EMG exam.

### DISCUSSION

Manual muscle testing is the most important determinant of subclinical polio in unaffected limbs.

The absence of subclinical polio in an unaffected limb was closely associated with the absence of weakness by exam and the absence of atrophy.

Additional studies with larger numbers are needed to determine if other risk factors (in addition to the four used in this study) are significantly associated with damage done at the

time of the original polio attack to unaffected limbs that could be used by polio practitioners in treating survivors.

### CONCLUSIONS

The best clinical predictor of subclinical polio in an unaffected limb is the presence of muscle weakness by exam.

Where an EMG is not available or practical, physicians should use a thorough manual muscle test and identify the presence of any atrophy.

Knowing whether or not there is subclinical polio is helpful in establishing a cardiovascular program for survivors using unaffected limbs.

### QUESTION & ANSWER SUMMARY

- Had repetition been used in muscle testing, the number of limbs with subclinical polio would still be the same because it was identified by the EMG.
- EMGs often give false negatives and additional studies do sometimes detect polio.
- More advanced EMG methods would probably have identified more limbs with subclinical polio.
- If a survivor in the study remembered a limb as being paralyzed or weakened during the polio attack, even if that limb fully recovered, that limb was excluded from the study.
- If a survivor has a record or remembers that a limb was weakened or paralyzed during the acute phase of polio, but then that limb fully recovered, he or she should expect to find subclinical polio in that limb. ▲

\*Gawne, AC, Pham, BT, & Halstead, LS. (1995). Electrodiagnostic findings in 108 consecutive patients referred to a post-polio clinic: The value of routine electrodiagnostic studies. In MC Dalakas, H Bartfeld & LT Kurland, (Eds.), *The Post-Polio Syndrome: Advances in the Pathogenesis and Treatment* (pp. 383-385). New York, NY: New York Academy of Sciences.

\*\*Halstead, LS, Gawne, AC & Pham, BT. (1995). National Rehabilitation Hospital limb classification for exercise, research and clinical trials in post-polio patients. In MC Dalakas, H Bartfeld & LT Kurland, (Eds.), *The Post-Polio Syndrome: Advances in the Pathogenesis and Treatment* (pp. 343-353). New York, NY: New York Academy of Sciences.