Excitability properties of human median axons measured at the motor point

宋家瑩

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摘要

Abstract

Threshold tracking was used to measure excitability indices (strength-duration properties, threshold electrotonus, and the current-threshold relationship) at the motor point of the abductor pollicis brevis, and the results were compared with those of the median nerve at the wrist. Using an accelerometer placed at the thumb tip, movement-related potentials were recorded as target responses. When stimulating at the same site, excitability measurements were no different, and their variability no greater, when the target responses were movements rather than muscle action potentials. Motor point stimulation resulted in significantly shorter strength-duration time-constant and higher rheobase than wrist stimulation. In addition, the technique of latent addition showed that a slow component was much smaller at the motor point than at the wrist. In threshold electrotonus, threshold changes in response to depolarizing and hyperpolarizing conditioning currents were significantly smaller at the motor point than at the wrist. The differences in strength-duration time-constant and latent addition suggest that persistent Na+ current at the resting potential is smaller at the motor point. The differences in threshold electrotonus may depend in part on altered fiber geometry but suggest that inward and possibly outward rectification are increased distally. Motor point excitability testing may provide new insights into the pathophysiology of the nerve terminals in a variety of peripheral neuropathies and motor neuron disorders.