Effects of surface electrical stimulation on the muscle-tendon junction of spastic gastrocnemius in stroke patients

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摘要

Abstract

PURPOSE: The purpose of this study was to explore the effects of spasticity suppression by surface electrical stimulation (ES) o the muscle-tendon junction of spastic gastrocnemius muscles in stroke. METHODS: Twenty-four neurologically stable stroke patients (aged 41-69 years, 12-35 months post-stroke), with spasticity graded 2 or 3 on the modified Ashworth scale, were recruited and divided into two groups. In the ES group, each patient received 20 min of surface ES once daily, 6 days per week for 1 month. In the control groups, ES was used with stimulation intensity kept at zero. To evaluate the therapeutic effect, the modified Ashworth scale, Fmax/Mmax ratio, H-reflex latency, H-reflex recovery curve, and the 10-m walking time were tested before and after the 1-month of treatment. RESULTS: In the ES group, the modified Ashworth scale showed a trend toward reduced spasticity after 1 month of treatment. The Fmax/Mmax ratio decreased from 8.10% +/- 4.84% to 4.00% +/- 1.36%; the H-reflex latency increased from 28.87 +/- 2.45 ms to 29.40 +/- 2.57 ms; the H-reflex recovery curves indicated a downward shift; and the 10-metre walking time significantly decreased after ES. In the control group, none of the measures showed a statistically significant change. CONCLUSIONS: In this study, we demonstrated a way to suppress spasticity at a metameric site and to increase walking speed effectively by applying surface ES on the muscle-tendon junction of spastic gastrocnemius muscles.