Electromyographic Biofeedback for the Recovery of Motor Function After Stroke

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The specific objective of this review was to determine the efficacy of any form of electromyographic biofeedback (EMG-BFB) used after a stroke in order to aid motor function recovery.

Search Strategy

Selection Criteria
Randomized and quasi-randomized studies comparing EMG-BFB with control for motor function recovery in stroke patients.

Data Collection & Analysis
Two review authors independently assessed trial quality and extracted data. Where possible we contacted study authors for further information. Any reported adverse effects were noted.

Main Results
Thirteen trials involving 269 people were included. All trials compared EMG-BFB plus standard physiotherapy to standard physiotherapy either alone or with sham EMG-BFB. Only 1 study used a motor strength assessment scale for evaluation.

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of patients, which indicated benefit from EMG-BFB (weighted mean difference 1.09; 95% CI, 0.48 to 1.70). EMG-BFB did not have a significant benefit in improving range of motion through the ankle (standardized mean difference 0.05; 95% CI, −0.36 to 0.46), knee or wrist joints. However, 1 trial suggested a benefit in range of motion at the shoulder (standardized mean difference 0.88; 95% CI, 0.07 to 1.70). Change in stride length or gait speed was not improved by EMG-BFB. Two studies used different assessment scores to quantify gait quality. One of these suggested a beneficial effect of EMG-BFB (standardized mean difference 0.90; 95% CI, 0.01 to 1.78). Most of the studies examining functional outcomes used different assessment scales, which made meta-analysis impossible. Two studies that used the same scale did show a beneficial effect (standardized mean difference 0.69; 95% CI, 0.15 to 1.23; Figure).

Implications for Practice

When all the available data are combined, EMG-BFB does not appear to have any positive benefit for recovery after stroke. It cannot be recommended as a routine treatment. A small amount of evidence from individual studies suggests that using EMG-BFB in combination with standard physiotherapy regimes may result in improvements in motor power, range of motion at the shoulder, functional recovery and gait quality beyond those of standard physiotherapy alone. Because there were no reported adverse effects, it would seem reasonable for EMG-BFB to be considered as a cautious treatment approach for individual patients whose circumstances match the inclusion criteria of the studies included in this review.

Implications for Research

There is need for a randomized clinical trial with adequate power, using standardized assessment scales and robust adverse event reporting, to assess the effectiveness of EMG-BFB.

Key Words: biofeedback □ EMG □ physiotherapy □ rehabilitation □ stroke □ stroke recovery
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