Unilateral and bilateral upper-limb training interventions after stroke have similar effects on bimanual coupling strength.

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Abstract

BACKGROUND:
Bilateral training in poststroke upper-limb rehabilitation is based on the premise that simultaneous movements of the nonparetic upper limb facilitate performance and recovery of paretic upper-limb function through neural coupling effects.

OBJECTIVE:
To determine whether the degree of coupling between both hands is higher after bilateral than after unilateral training and control treatment.

METHODS:
In a single-blinded randomized controlled trial, we investigated rhythmic interlimb coordination after unilateral (mCIMT) and bilateral (mBATRAC) upper-limb training and a dose-matched control treatment (DMCT) in 60 patients suffering from stroke. To this end, we used a series of tasks to discern intended and unintended coupling effects between the hands. In addition, we investigated the control over the paretic hand as reflected by movement harmonicity and amplitude. All tasks were performed before and after a 6-week intervention period and at follow-up 6 weeks later.

RESULTS:
There were no significant between-group differences in change scores from baseline to postintervention and from postintervention to follow-up with regard to interlimb coupling. However, the mBATRAC group showed greater movement harmonicity and larger amplitudes with the paretic hand after training than the mCIMT and DMCT groups.

CONCLUSIONS:
The degree of coupling between both hands was not significantly higher after bilateral than after unilateral training and control treatment. Although improvements in movement harmonicity and amplitude following mBATRAC may indicate a beneficial influence of the interlimb coupling, those effects were more likely due to the particular type of limb movements employed during this training protocol.

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