


# Causal involvement of DLPFC during bimanual coordination in older adults – an rTMS study

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The role of the dorsolateral prefrontal cortex (DLPFC) in the regulation of bimanual coordination appears to become crucial with aging. Age-related changes in the involvement of the DLPFC in bimanual coordination were studied by using disruptive repetitive TMS (rTMS), inducing a transient lesion in this brain structure. Neurophysiological as well as behavioral effects of suppressing DLPFC during the preparation and execution of a bimanual task were studied in 41 healthy adults (young and old). Specifically, we combined short-train rTMS with single pulse TMS to examine the effect of DLPFC suppression on the interhemispheric projection to the contralateral primary motor cortex (M1) during motor preparation. Findings revealed that compromised interhemispheric DLPFC-M1 disinhibition during motor preparation in older adults resulted in less accurate bimanual performance. The altered DLPFC-M1 interaction in older adults appeared to result from a decline in local inhibitory mechanisms in the DLPFC. In addition, the induction of DLPFC suppression affected task accuracy, but not movement stability in both age groups. Taken together, these results suggest that DLPFC acts as a key regulator in the control of bimanual movement coordination.

**Keywords:** Aging, bimanual coordination, dorsolateral prefrontal cortex (DLPFC), Interhemispheric interaction, repetitive transcranial magnetic stimulation (rTMS)

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