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Short latency TMS-evoked scalp-recorded potentials

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Background

Transcranial magnetic stimulation (TMS) evokes some short-latency scalp-recoded potentials which enable the direct study of connections between human brain areas. For this purpose, we tried to record the TMS -evoked potentials appearing within 100 msec after TMS.

Materials and methods

TMS and high-resolution EEG were used to study Short latency TMS-evoked scalp-recorded potentials in healthy six subjects. Primary motor area on the left side was stimulated magnetically and the EEG was recorded with 60 scalp electrodes. Evoked potentials were averaged and analyzed.

Results

We confirmed three components consisting of P25, N40 and P55 on the TMS-evoked scalp-recorded potentials. P25 and P55 components were positive deflections peaking at the latency of 25 ms and 55 ms post-stimulus, respectively. N40 component was negative deflection peaking at the latency of 40 ms post-stimulus. The scalp mappings revealed that P25 component had a potential distribution over the frontal areas on both sides, N40 component was spreading over the temporal and occipital areas on the right side. P55 component was localized in the central areas on both sides. These short latency components of TMS-evoked potentials tended to increase in amplitude as a function of TMS intensity.

Discussion

The origins of these short latency components were still controversial. The patterns of potential distributions suggest that each component, that is P25, N40 and P55, would reflect the independent neural responses to TMS from the different brain areas. Thus, the combination of TMS and EEG should be useful to study the human brain mapping.