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Comparison of movement related EEG potential during unexpected and self-paced gait initiation

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Current study designs to compare cortical activation patterns between unexpected and self-paced gait initiation (GI) condition. To achieve the research goal, movement related cortical potential (MRCP) and event related desynchronization (ERD) in mu rhythm, were analyzed to identify difference between both conditions in relation to cortical area. Participants performed 30 trials of each GI under choice reaction time paradigm. During the each GI trial, data were recorded simultaneously from 32 channels of EEG electrodes, 2 force plates, and a surface EMG electrode on the tibialis anterior. The region of interest for MRCP were premotor, supplementary and primary motor area (Cz, Fz, F3 and F4) where MRCP was observed clearly and bilateral motor cortex (C3 and C4) for ERD of mu rhythms were selectively analyzed. For statistical analysis, MRCP onset times, peak MRCP amplitudes, and ERD amplitudes were analyzed using repeated measures analysis of variance (ANOVA). Major findings of this study are as follows: (1) The duration from MRCP onset time to movement onset was significantly shorter for unexpected GI than for self-paced GI in all EEG channels, (2) The peak amplitude of MRCP for unexpected GI was significantly greater than that of self-paced GI. (3) Regardless of electrode site, ERD amplitude was significantly higher in unexpected GI compared with self-paced GI. These results demonstrate that neuro-locomotion controls are different for unexpected and self-paced action. Furthermore, unexpected GI appears to require more augmented brain activity than self-paced GI.

Biography

Joo-Hee Park has completed her Master's degree from Yonsei University and Doctoral degree from Yonsei University School of Physical Therapy.

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