

Analysis of Single Trial Movement-Related Potentials During Skilled Performance

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Recently Chiarenza et al (1987) and Cerutti et al (1988) have described a parametric method of identification of single trial movement related brain macropotential through an autoregressive algorithm with exogenous input. In this model the basic estimation of the information contained in the single trial is taken from an average of a sufficient number of trials, while the noise sources, EEG and EOG are characterised as exogenous inputs. The task employed to record the movement related potentials, consists in self-pacing a bimanual motor sequence to calculate a time interval of 50 ± 10 ms represented by the course of a sweep on a screen. Such a task requires of the subject advanced programming of suitable motor strategies and their updating through sensory kinesthetic and visual feedback. Because of these characteristics, the analysis of the single trial movement related brain macropotentials seems suitable to describe the changes of the potentials during the learning phase and the relationships between single movement related potentials and performance. Three 20 year old male right-handed subjects participated in the experiment. The movement-related potentials were recorded from Fz, Cz, Pz referred to linked mastoids. Bipolar EOG was also recorded. The linear regressions between performance and single trial movement potential have shown that successful performance demands an "optimal" level of preparation and correction of errors in terms of duration and amplitude of Bereitschaftspotential and skilled performance positivity respectively.