

Abstract

Title of thesis: Source analysis and comparison of Feldenkrais inspired movement and visual stimulation using sLORETA

Objectives: The thesis aim is to evaluate intracerebral source activity during a simple arm movement inspired by Feldenkrais method and to compare it with a visual stimulation of the same movement presented in a clip and with an imagination of the same movement. The movement inspired by Feldenkrais method was simplified to a repeated flexion of the dominant arm. Source analysis was evaluated from EEG and processed using sLORETA program,

Methods: To obtain the data, experimental group was put together containing 12 participants aged 22-60, (mean = 27.2), both genders included. Participants were subjected to one-off measurement by the EEG instrument. Feldenkrais inspired movement of a flexion of a dominant upper right arm was investigated. The experiment consisted of six parts: 1. native EEG record with eyes closed and open, 2. active flexion of the dominant upper arm with eyes closed, 3. active flexion of the dominant upper arm with eyes opened, 4. watching video presenting repeated upper arm flexion, 5. dominant upper arm flexion imagination with eyes closed. Every part lasted for two minutes. Between individuals parts was inserted a pause. Obtained EEG data were processed with sLORETA software to localize activity in brain cortex. Results of individual participants were subjected to Student's paired t-test in order to draw a final conclusion. Data in the active movement with closed eyes was compared with the imagination of the same action, which is used as a part of Feldenkrais method. Brain activity in the same movement with open eyes was compared with the activity in visual stimulation during which respective participants watched a clip of the same movement.

Results: The results of this thesis showed, after processing EEG data in sLORETA software, statistically significant difference in brain activity in comparison of both parts of the research. In localization of brain activity in the movement inspired by Feldenkrais method with closed eyes the result showed a statistical significance of $p \leq 0,01$ at the frequency zone theta in regions associated with motor learning (BA 4 and 6) and in temporoparietal cortex associated with broader sensoric and memory processes (BA 3, 22, 42, 43). In the second part of the experiment, comparison of the active movement with eyes opened with visual stimulation were shown, with a statistical significance of $p \leq 0,01$ for frequency zone beta-2, beta-3 and $p \leq 0,5$ for beta-1, was found a difference in occipital cortex associated movement observation

and mirror neuron regions (BA 17, 18 a 19). Furthermore were activated areas in parietal (BA 5, 7, 39, 40) and temporal cortex (BA 20-22, 37, 39, 41, 42).

Keywords: sLORETA, brain activity, Feldenkrais method, movement imagination, visual stimulation, mirror neurons, Brodmann's areas