Springer Link

Journal of Neurology

Journal of Neurology

June 1999, Volume 246, Supplement 1, pp I1–I185 | Cite as

Ninth Meeting of the European Neurological Society 5–9 June, 1999, Milan, Italy

Abstracts of Symposia, Free Communications and Posters

Functional magnetic resonance imaging (fMRI) of the human sensorimotor cortex during whole-hand afferent electrical stimulation.

Golaszewski S[1], Dimitrijevic MM, Kremser C, Zschiegner F, Hackel M, Lechner-Steinleitner S, Berger M, Gerstenbrand F, Aichner F, Felber S, Dimitrijevic MR.

Abstract

Electrical stimulation of the whole hand using a mesh-glove has been shown to improve volitional movement of the hand and arm, and decrease muscle hypertonia after hemispherical stroke in patients who have reached a recovery plateau. The goal of this study was to investigate the effect of stimulation of the nerve afferents of the hand on brain cortical activity elicited by whole-hand subthreshold stimulation for sensation in humans with intact nervous systems. Brain cortical activity in 6 healthy subjects (30-45 years) was studied using blood oxygenation level-dependent functional Magnetic Resonance Imaging during a test motor task, finger-to-thumb tapping and after 20 minutes of mesh-glove stimulation of the resting hand prior to performance of an identical motor task, to test the changes in the conditioned motor task established after 20 minutes of mesh-glove stimulation. Fifteen contiguous echo-planar sequences parallel to the bi-commissural plane were acquired for functional magnetic resonance. Post-processing of image data included correction of motion artefacts and calculation of correlation coefficients between the signal intensity of pixels during rest and finger tapping and a rectangular reference wave function. The functional Magnetic Resonance Imaging examinations revealed a signal increase in the primary and secondary motor and somatosensory areas when comparing the number of activated pixels during test and conditioned motor tasks. Our preliminary study indicated that change occurred in a definite pattern in the region of the regional cerebral blood flow of the brain cortex after mesh-glove whole-hand stimulation at the subthreshold level for sensation. We assumed that this increase in regional cerebral blood flow also reflected augmented neuronal activity.