

**The Feasibility of Event-Related Functional Magnetic Resonance Imaging of Power Hand Grip Task for Studying the Motor System in Normal Volunteers; Comparison with Finger Tapping Task**

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**목적** : To evaluate the feasibility of the event-related functional MR study using power grip studying the hand motor system

**대상 및 방법** : Event-related functional MRI was performed on a 1.5T MR unit in seven norm volunteers (man=7, right-handedness=2, left-handedness=5, mean age: 25 years). A single-shot GRE-EPI sequence (TR/TE/flip angle = 1000ms/40ms/90, FOV = 240 mm matrix= 64x64, slice thickness/gap = 5mm/0mm, 7 true axial slices) was used for functiona MR images. A flow-sensitive conventional gradient echo sequence (TR/TE/flip angl 50ms/4ms/60) was used for high-resolution anatomical images. To minimize the gross hea motion, neck-holders (MJ-200, USA) were used. A series of MR images were obtained in axial planes covering motor areas. To exclude motion-corrupted images, all MR images wer surveyed in a movie procedure and evaluated using the estimation of center of mass of ima signal intensities.

Power grip task consisted of the powerful grip of all right fingers and hand movement ta used very fast right finger tapping at a speed of 3 per 1 second. All tasks were visual-guid by LCD projector (SHARP, Japan). Two tasks consisted of 134 phases including 7 activatio and 8 rest periods. Active stimulations were performed during 2 seconds and rest period were 15 seconds and total scan time per one task was 2 min 14 sec. Statistical maps we obtained using cross-correlation method. Reference vector was time-shifted by 4 seconds an Gaussian convolution with a FWHM of 4 seconds was applied to it. The threshold in p val for the activation sites was set to be 0.001. All mapping procedures were performed usin homemade program an IDL (Research Systems Inc., USA) platform. We evaluated the activation patterns of the motor system of power grip compared to hand movement in t event-related functional MRI.

**결과** : Event-related functional MRI using power grip and finger tapping tasks of right hand show the successful large activation of left primary motor cortex areas in all volunteers. N significant spatial differences in the primary motor cortex sites were shown between t different tasks. All volunteers activated supplementary motor areas (SMA) in power grip a finger tapping tasks, but their mean activation areas were found to be significantly larger power grip task than in finger tapping one(students paired t-test,  $p < 0.05$ ).

**결론** : Our findings represent two different motor functions are controlled in the same motor cortic sites and suggest SMA may be more strongly involved in power grip than in finger tappi Our results suggest event-related functional MRI of power hand grip may be useful investigating the hand motor system.