SUBACUTE AND CHRONIC WORKING MEMORY IMPAIRMENT IN BROCA’S PATIENTS

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Broca’s region and adjacent cortex presumably take part in working memory processes. Electrophysiologically, these processes are reflected in synchronized oscillations. EEG connectivity studies suggested involvement of left prefrontal cortex in at least two WM networks involved in maintaining verbal information. We present the longitudinal study exploring the effects of a stroke causing Broca’s aphasia on these processes and specifically on synchronized functional networks. We used high-density EEG and coherence analysis to map WM networks in ten healthy controls and ten Broca’s patients 0-3 and 9-12 months after stroke. Our results clearly show that a stroke resulting in Broca’s aphasia also alters two distinct WM networks, one in theta and the other in gamma frequency band. A year after the stroke, theta synchronization was enhanced comparing to subacute patients, involving more connections both ipsi- and contralaterally, with a right-lateralized trend. Gamma synchronization was still weak in the frontal regions and less left-lateralized, while its parietal part was completely restored. Our results contribute to the growing body of evidence that forms the basis of hypothesis that an upregulation in working memory and other domain-general systems occurs simultaneously with the recovery from aphasia.