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Perception of biological motion and acquisition of motor skill in patients with unilateral spatial neglect

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【Purpose】 The ability to recognize the whole target body is necessary for patients with unilateral spatial neglect (USN) to acquire motor skills by observing actions. Therefore, we studied how patients with USN perceive observed body image using biological motion (BM).

【Methods】 Patients with stroke with 10 and without 3 USN were studied. The patients with USN patients had different types of lesions, with differing severities of neglect. Frontal views of 2 different left-right asymmetric movements and of 3 different symmetric movements, generated by points of light denoting the major joints of an individual's body were used as BM stimuli. We asked subjects to watch each stimulus displayed on a screen carefully and record their interpretation of what the stimulus looked like. In addition, we had them performed upper limb motor learning tasks by mimicking the actions observed in the BM stimuli. We compared the results of motor learning with the corresponding BM perception.

【Results】 The results showed that 5 patients with USN could not identify asymmetric stimuli. Two of them could not identify symmetric biological motion or acquire motor skill by action observation. These 2 patients showed moderate neglect and hemianopia and had lesions in the posterior parietal lobe. The remaining 3 patients with USN could acquire motor skill by observing actions, showed moderate or mild neglect without hemianopia and had lesions in the frontal lobe or thalamus. The patients without USN could perceive the BM stimuli.

【Discussion】 We hypothesize that the USN patients with hemianopia or parietal lobe damage have difficulty learning motor skills by observing actions because they cannot perceive the whole target body. Other patients with USN might engage different attention systems depending on their environment rather than estimating the whole body based on a perception of only half of it.