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The role of functional MRI in diagnosing severe chronic disorders of consciousness

S.M. Golaszewski[1,2,3], M. Seidl[1,3,4], A.B. Kunz[1,4], M. Kronbichler[2,5], J. Crone[2,5], R. Nardone[1,3,6], E. Trinka[1,2,3], F. Gerstenbrand[4,7]

[1]Department of Neurology, [2]Neuroscience Institute, [3]Spinal Cord Injury and Tissue Regeneration Center, Paracelsus Medical University Salzburg, [4]Karl Landsteiner Institute of Neurorehabilitation and Space Neurology, Vienna, [5]Institute of Psychology, Paris Lodron University, Salzburg, Austria, [6]Department of Neurology, F. Tappeiner Hospital, Merano, Italy, [7]Department of Neurology, Medical University Innsbruck, Austria

Objective: Accurate diagnosis of severe chronic disorders of consciousness (DOC) after TBI is essential for clinical and rehabilitative care and decision-making. Neurobehavioral tests, which rely on the patients' intellectual and motor ability to communicate, are the most widely used diagnostic tools, since their advantage over clinical assessment has been validated. However, with the emergence of modern neuroimaging methods, especially functional MRI, objective physiological markers for assessing the state of consciousness are available in specialized clinics. They are, however not fully integrated in clinical routine, because their benefit has yet to be determined.

Material and methods: 15 patients in apallic syndrome (AS) and 5 patients in minimally conscious state (MCS) after TBI and other aetiologies were examined with somatosensory, auditory and event related paradigms in fMRI and evoked potentials (EP). The findings were compared to the neurobehavioural diagnosis and it was analyzed, if additional information from fMRI and EP confirmed or questioned the diagnosis.

Results: 3 out of 15 patients in AS showed fMRI activation in event related paradigms, suggesting that patients are in MCS or in beginning remission.

Conclusion: Uncertainty in diagnosis still exists even with well-established diagnostic assessment scales. As long as internationally accepted guidelines for assessing patients with chronic DOC do not exist, every single diagnostic modality available in each clinical setting should be performed, to minimize diagnostic error and to find ways, in terms of perceptive channels, to approach the patients. FMRI has the potential to bring diagnostics in chronic DOC forward to the next level.

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Oral somatosensory association with visual cortex

N. Narita[1], K. Kamiya[2]

[1]Neurological Dentistry, Nihon University School of Dentistry at Matsudo, Mastudo, [2]Removable Posthodontics, Nihon University School of Dentistry at Matsudo, Japan

Introduction: Braille reading by blind individuals has been reported to cause visual cortex activation (Fujii T, et al. Neurosci Res. 2009, 65(2):175-86), while sighted individuals require training to activate the visual cortex (BMC Neuroscience 2006, 7: 79). When considering the oral region, even though it is naturally impossible to see inside the oral cavity by oneself or the food bolus while chewing, proper chewing is possible without any injury to the tongue and cheek. In this study, we attempted to clarify the specificity between oral tactile discrimination and visual cortex activity.

Methods: 6 healthy subjects participated in this study. For shape discrimination, we used 6 differently shaped test pieces, and the time duration of each discrimination trial in the mouth was 10 seconds, with 40-second rest intervals. F-NIRS was used to measure occipital cortex activity.

Results: Shape discrimination by the mouth activated the primary visual cortex, association visual cortex, and somatosensory association cortex. Furthermore, visual cortex activity in incorrect answer was significantly increased as compared with that in correct answer.

Conclusion: Primary and association visual cortices are especially involved in shape discrimination in the mouth. In addition, visual cortex activity during shape discrimination is enhanced during the incorrect task performance, which may conceptually coincide with the previous report 'Practice makes perfect: the neural substrates of tactile discrimination'.

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EFNS EUROPEAN FEDERATION OF NEUROLOGICAL SOCIETIES

HEADOFFICE Breite Gasse 4/7
1070 Vienna, Austria

PHONE + 43 1 889 05 03
FAX + 43 1 889 05 03 13
EMAIL headoffice@efns.org
WEB www.efns.org

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SUNDAY, SEPTEMBER 9, 2012

14:30-16:00 POSTER AREA

POSTER SESSION 1: NEUROIMAGING/ -SONOLOGY (CONTD.)

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P1844	**Oral somatosensory association with visual cortex** *N. Narita[1], K. Kamiya[2]* [1]MASTUDO, [2]MATSUDO, JAPAN
P1845	**Structural and metabolic correlates of neuropsychological dysfunction in multiple system atrophy and Parkinson's disease** *C. Kobylecki[1,2], K. McDonald[1,2], J. Thompson[1,2], J. Anton[1], R. Hinz[1], A. Gerhard[1,2]* [1]MANCHESTER, [2]SALFORD, UK

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