

## Oials

gation was performed without levodopa therapy and 30 minutes after levodopa administration, in 2 separate sessions.

**Results:** The data obtained show a significant reduction of the TR-NWR and the TST-NWR in PSP, MSA and PD patients when compared with HC, without any statistical differences among the 3 patients' groups. After Ldopa administration, we found a statistically significant increase of the TR-NWR only in the PSP group, while no significant effect of levodopa was detected in the other 2 groups of patients.

**Summary/Conclusions:** Our findings suggest an increased facilitation of pain processing in PSP, MSA and PD. This is likely a consequence of the degenerative phenomena involving central projections implicated in the modulation of pain, which make patients more predisposed to develop pain condition. The modulatory effect of levodopa, on pain, observed in this study exclusively in the PSP group, seems apparently in contrast with the lower motor response to levodopa typical of PSP patients. This unexpected finding may be related to the different distribution and severity of the neurodegenerative process in PSP as compared to PD or MSA.

**Disclosure:** No significant relationships.

**Keywords:** pain, progressive supranuclear palsy, Parkinson's Disease, nociceptive flexion reflex

## O-31

### THE ROLE OF FUNCTIONAL MRI AND COGNITIVE EVOKED POTENTIALS IN DIAGNOSING SEVERE CHRONIC DISORDERS OF CONSCIOUSNESS

*S.M. Golaszewski<sup>1</sup>, M. Seidl<sup>2</sup>, K. Schwenker<sup>1</sup>, A.B. Kunz<sup>2</sup>, R. Nardone<sup>1</sup>, E. Trinka<sup>3</sup>, F. Gerstenbrand<sup>4</sup>*

<sup>1</sup>Neurology, Paracelsus Medical University, Salzburg/AT, <sup>2</sup>Tms & Fmri Lab, Paracelsus Medical University, Salzburg/AT, <sup>3</sup>Neuroscience Institute, Paracelsus Medical University, Salzburg/AT, <sup>4</sup>Karl Landsteiner Institute for Neurorehabilitation and Space Neurology Vienna, Paracelsus Medical University, Wien/AT

**Background:** 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.

**Aims:** To improve the diagnosis and prognosis of patients with severe chronic disorders of consciousness.

**Methods:** 25 patients in apallic syndrome (AS) and 10 patients in minimally conscious state (MCS) after TBI and other etiologies were examined with somatosensory, auditory and event related paradigms in fMRI and evoked potentials (EP). The findings were compared to the neurobehavioral diagnosis and it was analyzed, if the additional information from fMRI and EP confirmed or questioned the diagnosis.

**Results:** 8 out of 25 patients in AS showed fMRI activation in event related paradigms, suggesting that patients are in MCS or even better.

**Summary/Conclusions:** 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.

**Disclosure:** No significant relationships.

**Keywords:** severe chronic disorders of consciousness, fMRI, cognitive evoked potentials, Apallic Syndrome

## O-32

### TRAINING OF VISUOMOTOR COORDINATION IN PATIENTS WITH STROKE AND PARKINSON'S DISEASE USING THE PABLO-DEVICE

*R.J. Seitz<sup>1</sup>, A. Kammerzell<sup>1</sup>, M. Samartz<sup>1</sup>, H. Köster<sup>1</sup>, P. Verschure<sup>2</sup>, D. Ram<sup>3</sup>*

<sup>1</sup>Department of Neurology, Heinrich-Heine-University Düsseldorf, Düsseldorf/DE, <sup>2</sup>Universidad Pompeu Fabra, Barcelona/ES, <sup>3</sup>Tyromotion, Graz/AT

**Background:** Computerized gaming scenarios have been hypothesized to enhance the performance of visuomotor coordination of hand function in neurorehabilitation.

**Aims:** We sought to assess the training effect of visuomotor tracking in healthy subjects and in patients with either focal brain lesions or extrapyramidal neurological deficits using the commercially available, multifunctional PABLO gaming device.

**Methods:** 50 healthy right-handed subjects, 15 patients after acute cerebral artery stroke, 15 patients with mid-stage Parkinson's disease, and 15 patients with normal pressure hydrocephalus were trained on consecutive days. The handheld PABLO-device is equipped with force and acceleration sensors and connected to a personal computer for on-line data display and data storage. The subjects were trained to navigate a target through obstacles in a virtual reality environment. Performance was assessed by modulation of force production and rotation of the hand in a visuomotor tracking paradigm.

**Results:** Training of the right dominant hand improved visuomotor coordination of hand rotation movements in both hands in the healthy subjects ( $p=0.0015$ ). Training of the right affected hand improved visuomotor coordination of hand rotation movements in either patient group ( $p=0.05$ ). In contrast, training improved the visuomotor coordination of force tracking of the dominant hand only in the healthy subjects ( $p < 0.01$ ).

**Summary/Conclusions:** The visuomotor training scenarios were effective to improve visually guided hand coordination within three days in healthy controls and in the patient groups. The easy to handle PABLO-device opens broad assessment and training applications in neurology and neurorehabilitation.

**Disclosure:** Dr. Ram is partner of Tyromotion which is a company that produces and markets rehabilitation devices including PABLO.

**Keywords:** assessment, hand movements, visuomotor coordination, gaming systems, training

## O-33

### DELAY OF LATE-VEIN PHASE CORTICAL VEIN FILLING IN ACUTE ISCHEMIC STROKE PATIENTS

*S. Bhaskar<sup>1</sup>, A. Bivard<sup>2</sup>, M. Parsons<sup>3</sup>, M. Nilsson<sup>4</sup>, J.R. Attia<sup>5</sup>, P. Stanwell<sup>6</sup>, C. Levi<sup>7</sup>*

<sup>1</sup>Hunter Stroke Services, Department of Neurology, John Hunter Hospital, New Lambton/NSW/AU, <sup>2</sup>Department of Neurology, John Hunter Hospital & Hunter Medical Research Institute (HMRI), University of Newcastle, New Lambton/NSW/AU, <sup>3</sup>Department of Neurology, John Hunter Hospital & Hunter Medical Research Institute (HMRI), University of Newcastle, New Lambton/AU, <sup>4</sup>Centre for Translational Neuroscience and Mental Health, School of Health Sciences, Hunter Medical Research Institute, University of Newcastle, New Lambton/NSW/AU, <sup>5</sup>Centre for Clinical Epidemiology & Biostatistics, Hunter Medical Research Institute (HMRI), University of Newcastle, New Lambton/AU

**Background:** Evaluation of flow patterns and dynamics associated with the arterio-venous system may be useful: in the prognosis of acute stroke and towards patient selection for acute and long-term intervention strategies.

**Aims:** We report a novel phenomenon, delayed late-venous phase cortical vein filling (LCVF), observed on dynamic CT angiographic (CTA) imaging in acute ischemic stroke patients. We examined the frequency of delayed LCVF and its association with ischemic penum-

bra, neurological improvement or deterioration within 24 hours, and 90 days functional outcomes.

**Methods:** Dynamic CT angiographic (CTA) images of acute ischemic stroke patients, who were being assessed for potential suitability for reperfusion therapy at a comprehensive stroke centre, were prospectively studied. Delayed LCVF is defined by late-venous phase opacification of cortical veins despite contrast clearance from contralateral cortical veins on dynamic CTA imaging. We also recorded admission and 24 hour National Institutes of Health Stroke Scale (NIHSS) scores. Clinical outcome at 90 days was assessed using modified Rankin Scale (mRS) in a stroke clinic. Regression analyses were used to study the association of LCVF with early neurological changes (at 24 hours) and functional outcomes at 90 days.

**Results:** Of a total of 117 patients (mean age =70.6±13.3 years; males =56 (48%) with hemispheric ischemic stroke with acute CTA included in the study, 56 (48%) demonstrated delayed-LCVF. Patients who showed delayed-LCVF tended to have infarcts with lower penumbral volumes, although this was not significant (Median penumbra volume (IQR), in ml=48 (78) vs 63 (74);  $p=0.417$ ). Specifically, delayed-LCVF was linked to small penumbral ( $\leq 25$  mL) volume (37.5% vs 25.4%; OR=1.76; 95% CI= [0.79, 3.91];  $p=0.165$ ) or larger core ( $> 25$  mL) volume (35.7% vs 25.4%; OR=1.63; 95% CI=[0.73, 3.63];  $p=0.232$ ). Patients with delayed-LCVF were not significantly associated with clinical outcomes at 90 days (OR=1.34; 95% CI=[0.65, 2.79];  $p=0.432$ ), however they showed a greater risk of unfavourable outcome (48% vs 41%).

**Summary/Conclusions:** Delayed-LCVF is frequently seen in patients with acute ischemic stroke, and may be associated with relatively smaller penumbra. The presence of delayed LCVF in those with a large penumbra may also carry a poor prognosis. Although these findings need to be tested in a larger sample.

**Disclosure:** No significant relationships.

**Keywords:** ischaemia, venous flow, clinical outcomes, multi-modal neuroimaging, penumbra

## NEUROMODULATION, PHARMACOLOGY AND POST-SURGICAL REHABILITATION

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### MODULATION OF THE DEFAULT MODE NETWORK CONNECTIVITY BY INFRA-LOW FREQUENCY NEUROFEEDBACK

*O.R. Dobrushina<sup>1</sup>, E.V. Pechenkova<sup>2</sup>, R.M. Vlasova<sup>2</sup>, A.D. Rumshiskaya<sup>2</sup>, L.D. Litvinova<sup>2</sup>, I.V. Sidiyakina<sup>1</sup>, E.A. Merzhina<sup>2</sup>, V.E. Sinitsyn<sup>2</sup>*

<sup>1</sup>Neurorehabilitation, Treatment and Rehabilitation Center of the Ministry of Health, Moscow/RU, <sup>2</sup>Radiology, Treatment and Rehabilitation Center of the Ministry of Health, Moscow/RU

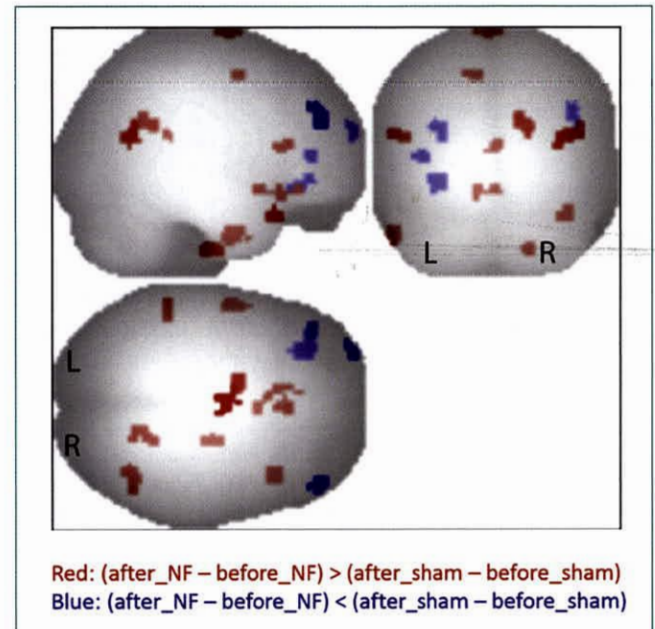
**Background:** Dysfunction of default mode network (DMN) is associated with variety of neurological and psychiatric disorders and thus is a feasible potential target for neurorehabilitation. Infra-low frequency neurofeedback (ILF NF) is thought to, but is not proven to target brain intrinsic connectivity networks.

**Aims:** To evaluate the influence of single ILF NF session on DMN connectivity.

**Methods:** 26 healthy young adults were randomized into real (n=15) or sham (n=11) ILF NF groups. During 30-min ILF NF session they observed a virtual reality game with a moving rocket. The speed of the rocket was defined in real time by the 0.5 mHz fraction of scalp EEG signal from T4–P4 site (right middle temporal gyrus and right inferior parietal lobule; bipolar montage). In the sham group, a pre-recorded EEG of age and sex-matched volunteer was used. Immediately before and after real or sham ILF NF resting state fMRI was performed on 3T MRI scanner. The data were preprocessed in SPM 8. First-level analysis included reconstruction of the DMN in CONN14p package with the

use of seed-based approach: seeds in medial prefrontal cortex (MNI coordinates 0; 48; -3) and in posterior cingulate cortex (0; -48; 39). During second-level analysis, the changes in DMN connectivity were compared between groups (significance level –  $p < 0.005$  at the level of voxels without correction for multiple comparisons, clusters over 50 voxels were included).

**Results:** ILF NF resulted in an increase in DMN connectivity in anterior cingulate cortex, temporal poles, inferior parietal lobules bilaterally, right precuneus, left supplementary motor area and in a decrease – in left orbitofrontal cortex and frontal poles bilaterally. Thus, and increased connectivity of the posterior and decreased connectivity of the anterior part of DMN was observed after ILF NF from T4–P4 site (see image).



**Summary/Conclusions:** This study demonstrates the possibility of DMN connectivity modulation by ILF NF.

**Disclosure:** The study was supported by EEGinfo Association.

**Keywords:** resting state fMRI, default mode network, neurofeedback, intrinsic connectivity networks

O-35

### EFFECTS OF 1-HZ RTMS OVER CONTRALATERAL TRICEPS AREA ON REACHING MOVEMENTS OF CHRONIC STROKE PATIENTS. A CROSSOVER, SHAM CONTROLLED, DOUBLE BLIND STUDY WITH ROBOTIC-ASSESSED PRIMARY OUTCOME MEASURE. PRELIMINARY RESULTS

*L. Sebastianelli<sup>1</sup>, V. Versace<sup>1</sup>, K. Malfetheriner<sup>1</sup>, S. Martignago<sup>1</sup>, S. Obletter<sup>2</sup>, M. Falk<sup>2</sup>, F. Gasser<sup>2</sup>, E. Winkler<sup>2</sup>, M. Lavoriero<sup>3</sup>, G. Gisser<sup>3</sup>, L. Saltuari<sup>3</sup>*

<sup>1</sup>Neurorehabilitation, Krankenhaus Sterzing – Research Unit for Neurorehabilitation of South Tyrol, Sterzing/IT, <sup>2</sup>Inova Q GmbH, Bruneck/IT, <sup>3</sup>Neurology, Hospital Hochzirl-Natters, tirol kliniken, Natters/AT

**Background:** Interhemispheric inhibition (IHI) is physiologic interaction between primary motor cortices (M1). However, after unilateral M1 lesion, IHI is recognized to have unfavourable effects on residual motor function.

Inhibition of contralesional (cM1) hand area through repetitive transcranial magnetic stimulation (rTMS) reduces IHI effects and can improve hand function, whereas only few data exist on IHI in upper limb proximal muscles.

# NEUROLOGIE & REHABILITATION

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### Abstracts

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