Method: 53 spinal cord injury and 6 multiple sclerosis patients with neurogenic detrusor overactivity requiring regular self-catheterisation, failing on oral anticholinergics were randomised to receive a single dose of BTX A (BOTOX® 200U or 300U) or placebo. Effects on maximum cystometric capacity (MCC), reflex detrusor volume (RDV) and maximum detrusor pressure during bladder contraction (MDP) were measured throughout 24 weeks post-treatment.
Results: Improvements in bladder management were observed in both BOTOX® groups. Significant increases ($p \leq 0.020$) in mean MCC and significant decreases ($p \leq 0.023$) in MDP from baseline were seen at all post-treatment timepoints. No such changes were observed with placebo. 23 patients experienced no RDV for at least 1 follow-up visit, 91% of whom were in a BTX A-treated group. For patients having a post-treatment RDV, significant increases ($p \leq 0.021$) from baseline were seen at weeks 6 (300U) and 24 (200U). No drug-related adverse events were reported. No patient was positive for neutralising antibodies at baseline or study end.
Conclusion: BOTOX® produced substantial improvements in urodynamics that suggest an increased ability of the bladder to hold and retain urine. BOTOX® may be an important therapeutic option for improving neurogenic bladder management and reducing risk of vesicoureteric reflux, potentially preventing upper urinary tract deterioration and kidney damage.

OPL141
Treatment of the chronic alien hand syndrome: compensating for loss of motor inhibition at the interface of planning and execution

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Background: The alien hand syndrome (AHS) is rare but extremely disabling because it interferes with everyday activities in a most unsettling and distressing way. No systematic exploration of the behavioural components has been performed and no treatment recommendations exist.
Method: Consecutive cases of chronic AHS were analysed during simulated daily activities according to a protocol and individual treatment options were developed aiming at compensating the loss of inhibitory motor behaviour.
Results: Eight stroke patients were included. All had lesions involving the anterior Corpus callosum as well as the upper frontomedial region. Two kinds of behavioural disturbance were predominant: either uncontrollable grasping and groping or a kind of counteracting which aimed at dissolving or disrupting the motor action being planned or performed. The latter we call "gegenarbeiten" (Counterworking), a more or less well-sequenced disruptive motor behaviour. Video-analysis showed spontaneously occurring avoidance behaviour such as hiding the affected hand or placing it at the far end of the table. For those cases such strategies were reinforced. Rhythmic behaviour could also interrupt the ongoing grasping of objects.
Conclusion: Therapy of the AHS focuses individually on the predominant type of interfering motor behaviour. This includes strategies to overcome forced grasping and groping with rhythmical and avoidance behaviour as well as limiting those counteracting and disruptive motor sequences ('gegenarbeiten') by fixating the interfering hand towards the body or placing it at the far side of the table.

OPL143
FMRI of the human sensorimotor cortex before and after post-stroke neurorehabilitative subsensory whole-hand afferent electrical stimulation

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Background: Stimulation of proprioceptive pathways using electrical stimulation with a mesh-glove showed improved motor performances of stroke patients with chronic neurological deficits. However these empirically proven beneficial effects were lacking any neurophysiological explanation.
Method: Ten healthy volunteers were studied using BOLD-fMRI with: 1. A test motor-task with finger-to-thumb tapping of the left hand, 2. a whole-hand afferent electrical mesh-glove-stimulation of the left hand below the sensory level for sensation for 30 minutes, 3. a second fMRI run with the same paradigm as in the test motor-task immediately after electrical stimulation and 4. a identical fMRI run 2 hours post-stimulation to test cortical changes induced by electrical stimulation. Experiments were executed on a 1.5 TESLA MR-scanner and data-analysis was performed with SPM99.
Results: Group-analysis of fMRI-data showed: 1. Baseline fMRI-examinations revealed brain activation of the primary and secondary sensorimotor cortex as previously described. 2. After electrical stimulation, an increase of activated pixels in the hand-areas could be detected. 3. Additionally however, activation of regions not visible in the baseline studies was noticed: ipsilateral inferior parietal lobule, pre- and postcentral gyrus and the superior parietal lobule. 4. Activations diminished to baseline-level 2 hours post stimulation.
Conclusion: FMRI-results indicate an increase in neuronal activity that may provide augmented neuronal excitability and augmented local-field-potentials within the sensorimotor cortex which can be successfully influenced by subsensory stimulation of afferent pathways. These neuromodulatory effects hold promise for a therapeutic potential of mesh-glove in neurorehabilitation of patients with impaired motor hand functions after stroke.

OPL144
FMRI Mapping of the sensorimotor cortex of the foot by vibrotactile stimulation

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Purpose: The aim of the study was the development of a paradigm for the mapping of the sensorimotor foot region in functional magnetic resonance imaging (fMRI) with vibrotactile stimulation. Therefore, a proper vibrotactile stimulus was developed and the elicited brain activation pattern was analyzed to find best vibration parameters and an optimized experimental protocol for the applicability of the developed paradigm in clinical functional diagnosis of the brain.
Methods: 10 healthy male subjects (25–45yrs) were stimulated with a vibrotactile stimulus within the arch of the right foot. The stimulus was delivered through a fully automated moving magnet actuator with frequency (0-100Hz) and amplitude (0-4mm) control. To avoid adaptation phenomena a stimulus wave form was formed as the product of a fixed vibration carrier signal and a modulation term which varied sinusoidally. The carrier frequency was held constant at 100 Hz at a fixed modulation frequency of 25Hz and a fixed stimulus intensity of 0.05N throughout the fMRI run.

Experiments were performed on a 1.5Tesla MR-scanner. For fMRI, we employed T2*-weighted single shot echoplanar sequences (TR/TE/α = 0, 96ms/66ms/90°, matrix = 64×64, acquisition time: 2sec, voxel dimension = 4×4×4mm). Twenty-four slices parallel to the bicommissural plane were simultaneously acquired in an event related

design with randomized stimulus presentation with stimulus duration of 1 sec as a 2×2 design with a vibration amplitude of 0.5 and 1mm and a vibration frequency of 25 and 50 Hz. A total amount of 120 volume images was acquired during a single fMRI run. The scan repetition time for the stimulus on/off conditions was 3s. Post-processing was performed offline with SPM99. A statistical parametric activation map was calculated for each of the 10 subjects and for the group of subjects with an uncorrected $p < 0.001$ on a cluster level of $k > 8$.

Results: FMRI group data of the 10 subjects showed brain activity: 1. bilaterally within the secondary somatosensory cortex located in the inferior parietal lobule, 2. contralaterally to the stimulated side within the primary sensorimotor cortex overlapping the pre- and postcentral gyrus, 3. bilaterally within the supplementary motor cortex within the superior frontal gyrus and 4. on the right hemisphere within the anterior cingular gyrus. The present study supports an increasing stimulus-response relationship between vibrotactile stimuli and the amplitude of the BOLD response within the primary sensorimotor cortex SM to a single vibrotactile event. Stimulus frequency did not significantly influence BOLD amplitude.

Conclusion: In the present study, an fMRI paradigm for vibrotactile stimulation of the foot could be implemented within the MR environment. The vibrotactile stimulus can be well defined and frequency and amplitude can be controlled. The stimulus with a modulation frequency of 25Hz is able to elicit brain activation within main centers of the sensorimotor cortex for the right foot within a group of 10 subjects. The described fMRI map by vibrotactile stimulation of the foot hold promise for the applicability in preoperative functional diagnosis of patients with brain tumors, in prognostic investigations for patients after head injury or within vegetative state as well as in the planning and functional monitoring in neurorehabilitation.

Epilepsy – Clinical

OPL145

Eyelids position - During epileptic versus psychogenic seizures

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Aim: Purpose of this study was to evaluate if the position of the eyelids (open or closed) helps to differentiate epileptic versus psychogenic seizures.

Patients and Methods: Forty adults with epileptic seizures (20 with frontal, 20 with temporal epilepsy) and 40 patients with psychogenic seizures were included in the study. We analyzed retrospectively by video analysis the position of the eyelids before clinical begin of the seizure and during the first 30 seconds after seizure onset.

A multivariate variance analysis was performed using the duration of open eyes within the analysis time window after seizure onset as the dependent variable (ranked values). Seizure type (temporal, frontal, psychogenic), gender (male, female) and eyelid position before seizure onset (opened, closed) constituted the independent variables.

Results: A highly significant effect of seizure type was found indicating that eyelids were closed significantly longer ($p < 0.001$) within the first 30 seconds of psychogenic seizures (20.85s, 69.5% of the time), compared to epileptic seizures of temporal (1.95s, 6.5%) or frontal (9.25s, 30.8%) origin. This difference was more pronounced in male patients with psychogenic seizures yielding a significant interaction between *seizure type and gender*. In addition, a significant interaction between *seizure type and eyelid position before* seizure onset indicated that eyes were mostly kept closed after onset of psychogenic seizures whereas eyes were opened early in epileptic seizures.

Conclusions: Our results suggest that keeping the eyes closed or close them within the first 30 seconds after seizure onset is highly suggestive of a psychogenic nature of a seizure.

OPL146

Neuropsychological and Language Profile in Benign Rolandic Epilepsy Over Time

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Background: Recent studies have shown that children with benign rolandic epilepsy have a variety of cognitive deficits. These studies have methodological flaws related to recruitment bias and assessment processes. This study aims to assess the cognitive profile of children with benign rolandic epilepsy, and determine its relationship with spike burden.

Method: Subjects were recruited from six EEG laboratories across Sydney. EEG's were analysed for spike frequency, trains and laterality. Comprehensive neuropsychological and language assessments were conducted at baseline and again at least 12 months later. Group means on cognitive measures were compared to normative means. Correlations were done to determine degree of agreement between EEG and cognitive functioning over time.

Results: 42 children were recruited (16 females; 26 males), aged 5 to 12 years. Intelligence and language ability were normal. There was a specific pattern of difficulties involving memory and phonological awareness. Over time the pattern of cognitive performance remained similar with significant improvement seen on some tests. Although particular EEG features were associated with cognitive performance there was minimal correlation with memory indices and tests of phonological awareness. Spike burden (frequency and trains) at times 1 and 2 were not related.

Conclusions: Children with benign rolandic epilepsy have specific difficulties in the areas of memory and phonological awareness, not explained by EEG features. These cognitive difficulties may be caused by a disturbance of brain function at a critical developmental time. It is recommended paediatricians evaluate academic performance specifically in areas of pre-reading, reading, spelling, and memory.

OPL147

Neurosurgical Resection of Hypothalamic Hamartomas for Epilepsy in 46 Patients

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Background: To treat previously considered inoperable, hypothalamic hamartomas by neurosurgical excision and dramatically improve their refractory epilepsy.

Design/Methods: SURGICAL: The procedure was performed with one of either two procedures. The first technique involved a transcallosal-intraforniceal approach. The second technique was performed with an endoscope. NEUROLOGICAL: The baseline seizure types and frequencies were recorded pre-operatively and subsequently reviewed (post-operatively). Other changes and/or complications were also noted.

Results: Forty-six patients had resection of their hypothalamic hamartomas with at least six months post-operative follow-up available. Their average age was 12.2 years (range 1.4 to 55 years) and consisted of 33 males. All patients had at least daily seizures, most with multiple, frequent, daily mixed seizure types including trademark gelastic seizures. Five patients had Pallister-Hall syndrome and one patient, Mohr syndrome. Forty-four patients had cognitive and/or behavioral problems. Eleven patients had a history of precocious puberty. Fifteen patients had follow-up for more than 12 months

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