

a median nerve was stimulated with a small figure-of-8 coil, 2 cm in diameter. We discussed the relation between a focality of the induced current and a distribution of CMAP due to the stimulated location and the orientation of the coil. This experiment showed that the greatest CMAP provided a result when the induced current flowed perpendicular to the median nerve. These facts were also proved in a nerve excitation model using a bull frog's sciatic nerve. Besides, the largest induced current flowed perpendicular to a short axis of the tank model.

**PS-44-12 Measurement of cauda equina, limb and terminal segment conduction times in demyelinating neuropathy using neuromagnetic stimulation**

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**Hypothesis:** Conduction times in different lower limb nerve segments may vary with duration and progression of neuropathy.

**Method:** Neuromagnetic stimuli delivered with extra-large twin coils elicit motor responses at selective low threshold sites at proximal and distal cauda equina. Although response amplitude may vary widely in normals, onset latency is stable. This allows reliable measurement of cauda equine conduction time (CECT), recording from lower limbs and striated sphincters.

**Results:** In a patient with acute inflammatory demyelinating polyneuropathy (AIDP) studied 36 hours after symptom onset, CECT was markedly prolonged. Although F response and motor terminal latencies were also prolonged in some lower limb muscles, conventional motor CVs and amplitudes were within normal limits (WNLs) without conduction block (which appeared later). Also, conduction time in the limb segments (distal cauda equina to knee, ankle) were WNLs; by contrast, the limb segment conduction time is usually prolonged in chronic inflammatory demyelinating polyneuropathy (CIDP), along with the cauda equina and terminal nerve segments. In a patient with CIDP, CECT and terminal latencies to striated sphincters were markedly prolonged or blocked (absent proximal cauda equina responses).

**Conclusion:** CECT may be the most sensitive early indicator of AIDP. Normal limb segment conduction time in AIDP may reflect the preserved integrity of the blood nerve barrier (BNB) there compared to the cauda equina and terminal nerve segments. Presumably, in CIDP, the BNB in the limb segment is also breached.

**PS-44-13 Transcranial magnetic stimulation in patients with acquired inflammatory demyelinating neuropathy**

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In order to evaluate the conduction abnormalities in the proximal peripheral nerve in demyelinating neuropathies, cervical and transcranial magnetic stimulations were examined in 10 patients with Guillain-Barré syndrome, 6 with CIDP and 2 with multifocal motor neuropathy. Each patient was examined in active and recovery stages of the illness. The EMG responses were recorded from the first dorsal interosseus or abductor digitorum minimi muscle. The lowest thresholds for eliciting EMG response by cervical (CvTh) and transcranial (CxTh) magnetic stimulation were determined.

The maximal motor evoked potential (MEP) under voluntary contraction of the target muscle was elicited by transcranial magnetic stimulation, and the size of MEP was compared with that of compound muscle action potential (CMAP) by the proximal peripheral nerve stimulation. Moreover the relation between MEP size and muscle strength was analyzed. The magnetic stimulation proved to be useful in the followings; 1) When there was increase in MEP size without any change of proximal CMAP, conduction block in the more proximal site was considered (3 patients). 2) The CvTh was elevated in 3 patients, and it was confirmed by the fact that the MEP size exceeded the proximal CMAP size. 3) The improvement of muscle weakness correlated with the change of MEP size, not with the proximal CMAP size.

**PS-45. EVENT-RELATED POTENTIALS (3): PSYCHIATRIC DISEASES AND CHILDREN**

**PS-45-1 Effect of subjects own face on N2 of event-related potential in schizophrenics**

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Visual event-related potentials (ERPs) were recorded from 15 right handed subjects (26.7 years) with normal EEG and in 15 schizophrenics (31.1 years) while they performed a modified version of oddball paradigm under facial recognition task. The stimulus sequence consisted of the picture of the subject's face (non target, rare 20%), one of the unfamiliar person's face (target, rare 20%) and one of the other unfamiliar person's face (non target, frequent 60%). Stimuli were presented on a TV screen for a duration of 66 mseconds at a distance of 1.5 m from the eye through an image memory board of the computer. Visual evoked responses were collected from 16 electrodes site with AG/AGCl electrodes referred to linked-ear. Subjects were asked to count target stimuli. ERPs elicited by stimuli contained potentials of P2, N2 and P3. Previously we reported the poor P300 of ERP for subjects own face in schizophrenics. However, in the case of N2, the amplitudes of N2 in schizophrenics were larger than those of control for all stimuli. The latencies of N2 for target and subjects face in schizophrenics were shorter than those of control. These results suggest us the schizophrenics response their own face in early stage of response. Moreover there was a task relevant difference of latency in control. There was no significant task relevant difference of latency in schizophrenics.

**PS-45-2 Relationship between the late positive component following N400 during a linguistic task and P300 during an oddball task in schizophrenia**

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We previously reported that late positive components (LPCs) as well as N400 of the event related potentials (ERPs) recorded during sentence completions task were attenuated in schizophrenic patients. Attention has recently been drawn to LPCs that succeed or perhaps overlap with N400, but interpretations of the cognitive processes underlying LPCs remain controversial. On the other hand a number of studies have reported schizophrenics as having reduced P300 amplitude. Because it has been suggested that the LPCs may be just a later manifestation of the P300 component, we

investigated the relationship between P300 components for visual stimuli during an oddball task and LPCs during a linguistic task in 28 medicated schizophrenic patients and 9 healthy controls. In the linguistic task, subjects were required to make a response based on the judgement whether sentence completions were semantically congruous or not. There were significant positive correlations between the mean amplitude of the P300 components and those of the LPCs in both schizophrenics and controls, and also within the schizophrenic sample itself. These results may imply that a common process underlies the reduced P300 and the reduced LPCs in schizophrenia.

#### PS-45-3 Dysfunction of anticipating movements in schizophrenia

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Schizophrenics are often poor at cognition of spatiotemporal continuity, especially when an object is concealed. Based on these findings, anticipation of movements in schizophrenia was investigated using a task in which a target moving in uniform straight motion was concealed before it reached a designated point and subjects were required to press a button when they judged that it reached there. Average summation of EEG activity was calculated, using the moment when the target was concealed as a trigger. Firstly the schizophrenics tended to press the button earlier than the healthy controls. Secondly we found that there was a positive component at a latency of about 300 msec following stimulus onset, and that the amplitude of this component was larger in schizophrenics than in healthy controls. In addition, in order to investigate what this positive component implies, we examined the relationship between this positive component and P300 elicited by visual stimuli in an oddball task, on their shapes, latencies, and amplitudes. However no relationship between them was found. Further investigation will be necessary to clarify the nature of this component.

#### PS-45-4 Contingent negative variation in schizophrenics under visually distracting conditions

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McCallum and Walter (1968) reported that attentional distraction reduced the amplitude of contingent negative variation (CNV). This finding has been supported by later studies (Tecce et al.). Although early CNV has been considered to reflect orienting response including passive attention since CNV was separated into two components (early and late CNV) by Rohrbaugh (1976), little is known about the effect of distraction on each CNV component, especially in schizophrenics showing heightened distractibility. In addition, no studies have ever tried to clarify whether or not the various locations of distracting factors in the visual field have influence on CNV.

In this study we investigate the relationship between the distracting effect and the different spatial positions of distractors in

schizophrenics. Normal adult subjects and schizophrenic patients performed a click-flash CNV paradigm with interstimulus interval of 2 second, while three distracting light emitting diodes (LEDs) were gleaming at the angle of 15°, 30° and 45° from the eye-fixed point, respectively. In normal subjects, early CNV was diminished only by 30° distractors, suggesting the existence of pre-attentive areas. In schizophrenic patients, early CNV amplitudes were reduced by not only 30° but also 15° distractors, while no other components were changed. Thus, schizophrenics showed higher tendency toward attentional distraction.

#### PS-45-5 ERP study on dissociative disorders

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Event-related potentials (ERPs) during an auditory "odd-ball" paradigm were studied in six patients with dissociative disorders. The patients showed significant reduction in the amplitudes of P300 during dissociative disorders compared with the levels at remission. The latency of P300 did not change significantly during and after dissociative disorders. In two patients who showed a high incidence of mismatch negativity (MMN) during and after dissociative disorders, the amplitudes of P300 increased at remission to a greater extent than in the other four patients who showed a low incidence of MMN, moreover, there was no significant difference in the level of atrophy in the superior temporal plane (STP) on their brain CT scans compared with that in the age- and sex-matched control group. The finding of the change in the amplitudes of P300 suggests that the mechanism of dissociation, which has been considered to be a defence mechanism of hysteria, can be psychophysiological evaluated by ERPs. The amplitudes of P300 might be a state-dependent biological marker of dissociative disorders. The low incidence of MMN and atrophy of STP suggest the possibility of trait-dependent cerebral dysfunction or fragility in dissociative disorders.

#### PS-45-6 P300 in depressed patients

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Endogenous components of event-related potentials (ERP) are of particular interest in psychiatric diseases because of their relations to cognitive and behavioral processes. Depressed patients often present with an apparent cognitive deficit which is based on affective and motivational etiologies. Previous findings were supported with delayed latencies and increased amplitude in depressed patients. We have studied different P300 performances as well as the relationship between each of the items on the Hamilton Rating Scale for Depression and the P300 latency of auditory event-related potential in 17 patients with diagnosis of major depressive disorder according to DSM-III and compared to 20 normal, non-psychiatric control subjects. P300 event-related potential was recorded using the auditory 'oddball' paradigm. Our preliminary results (considering that the study is being continued), indicating that P300 latency is longer in depressed patients, were statistically significant comparing to normal control subjects. Longer P300 latency also correlated with ratings of insomnia. These and other findings were discussed. The preliminary results are in accordance with the statement that P300 latencies may differentiate depressed patients from normal controls.