different rehabilitation programs. In our laboratory, segmental evoked potential studies, employed in the diagnosis of traumatic radiculopathies, have given consistently reproducible results in apparently intact neural pathways as well in symptomatic ones. When used to evaluate the effectiveness of a physical therapy modality in a given patient, by repeating tests on a weekly or monthly basis, the shortening of the previously prolonged evoked response latencies along the treated pathways matched the clinical impression and the patient's symptoms. Conversely, worsening of neurologic signs and symptoms were reflected in prolonging of response latencies along the involved nerve roots. In radiculopathies from herniated intervertebral discs, comparison of pre- and post-surgical test results allowed to draw meaningful conclusions and also helped in directing the post-surgical rehabilitation. In our experience, correctly performed segmental evoked response studies provide a noninvasive, well-tolerated, objective method to help in outcomes assessment of spinal nerve radiculopathy.

156. Syndrome-Specific Changes of Brain Activity After Stroke

T. Platz, H. Pintschovius, T. Winter, I.-H. Kim, K.-H. Mauritz (Berlin, Germany)

Hypothesis: Syndrome-specific functional disruptions after stroke, such as paresis, deafferentation, or ideomotor apraxia are related in specific changes of cortical activity during movement. **Methods:** Functional cortical changes are documented by means of movement-related DC potentials (MRP & dipole reconstruction) [EEG], event-related desynchronization (ERD) of alpha and beta band activity (EEG), and motor cortex mapping (TMS). **Results:** Motor efference disruption (paresis) can induce increased MRP at frontal electrodes and widespread increase of ERD-alpha; type of reorganization could depend on severity of pyramidal damage. Somatosensory deafferentation can be associated with reduced MRP and ERD-alpha recorded over the primary sensorimotor cortex. Praxis production disruption (ideomotor apraxia) can be related to increased MRP and ERD-alpha at frontomesial (or frontolateral) recording sites as well as reduced ERD-beta over the left hemisphere. **Conclusion:** Recording both MRP (DC) and sensorimotor rhythms (ERD-alpha or -beta) reveals differential information about movement-related electric brain activity. Clinical syndromes after stroke are related to differential pattern of functional cortical reorganisation as assessed by movement-related electric brain activity; as a function of the disrupted functional system, both syndrome-specific focal and more global changes do occur.

157. Neuronal Control of Spasticity

F. Gerstenbrand, M. R. Dimitrijevic, M. Pinter, H. Binder (all from Vienna, Austria)

In recent years of the contemporary medical practice control of spasticity has been improved by introducing newly developed drugs to the clinical practice as well as by newly developed technologies of the biomedical industry, together with new tools for clinical programmes for intrathecal applications of drugs and epidural electrical stimulation of the spinal cord network. The fundamental principle is the modification

of neuronal network activity by electrical stimulation or by pharmacologic modifications of their synaptic activity to control muscle hypertonia as well as augment residual subclinical impaired but present volitional motor activity of the paralyzed muscles. This presentation reports on the features of motor unit activity, recorded by surface electrode polyelectromyography in 25 posttraumatic chronic spinal cord injury patients (12 clinically complete, 3 incomplete wheelchair-bound, and 5 incomplete but ambulatory). It shall be documented that so-called clinically complete spastic patients are actually neurophysiologically incomplete due to presentation of brain facilitatory excitation of subclinical nature. Thus clinically complete spastic spinal cord injury patients should be classified as "discomplete." In five discomplete patients spinal cord was used stimulation of the upper segment of the lumbar spinal cord for successful improvement of spasticity by induced segmental inhibition as well as excitation. The results demonstrate a reduced brain influence on neurocontrol of spasticity.

158. Gait Kinematics in Treadmill Walking and in Walking on Normal Surface

Dr. Friedemann Müller, G. Hoch, E. Hartmann, and E. Koenig (Bad Aibling, Germany)

Quantitative gait assessment has been a rapidly expanding field during the last years due to new reliable techniques with increasing ease of use and decreasing restrictions of walking during measurement. Therefore clinicians start to appreciate the sensitivity and clinical use of gait analysis systems in daily practice. The advent of reliable insoles with satisfying spatial and temporal resolution for footprint analysis allows for the analysis of walking under various circumstances. Using the PAROTEC footprint system with 24 hydrocells per foot we compared foot pressure patterns while walking on normal surface with walking patterns on a treadmill. Gait lines, distribution and rate of pressure development, as well as symmetry and timing during gait cycle were analysed in 15 healthy control subjects. Three speeds of treadmill velocity (0.3, 0.5, 1.0 m/sec) were compared with three matched rates of cadence. All analyzed parameters (symmetry, variability, pressure rate, etc.) depend heavily on velocity, while only minor differences could be attributed to the type of walkway. Similarity of walking patterns thus supports the idea of gait training on a treadmill for hemiparetic patients and good transfer to normal walking. Measurements of patients during training will be presented to support this conclusion.

159. Motor Learning in Elderly: Implications for Rehabilitation Therapy

L. Piron (Venezia, Italy), E. Bricolo (Trieste, Italy), P. Tonin (Venezia, Italy), and M. Dam (Padova, Italy)

Previous studies have characterized some aspects of motor learning in young subjects (i.e., adaptation to forces perturbing the motion of limbs). It is not well known whether motor adaptation changes with aging. Twelve subjects, ranging from 50 to 74 years old, were asked to execute point to point movements, between the center of the workspace and one of eight possible targets, arranged planarly in a semicircle. Subjects had to

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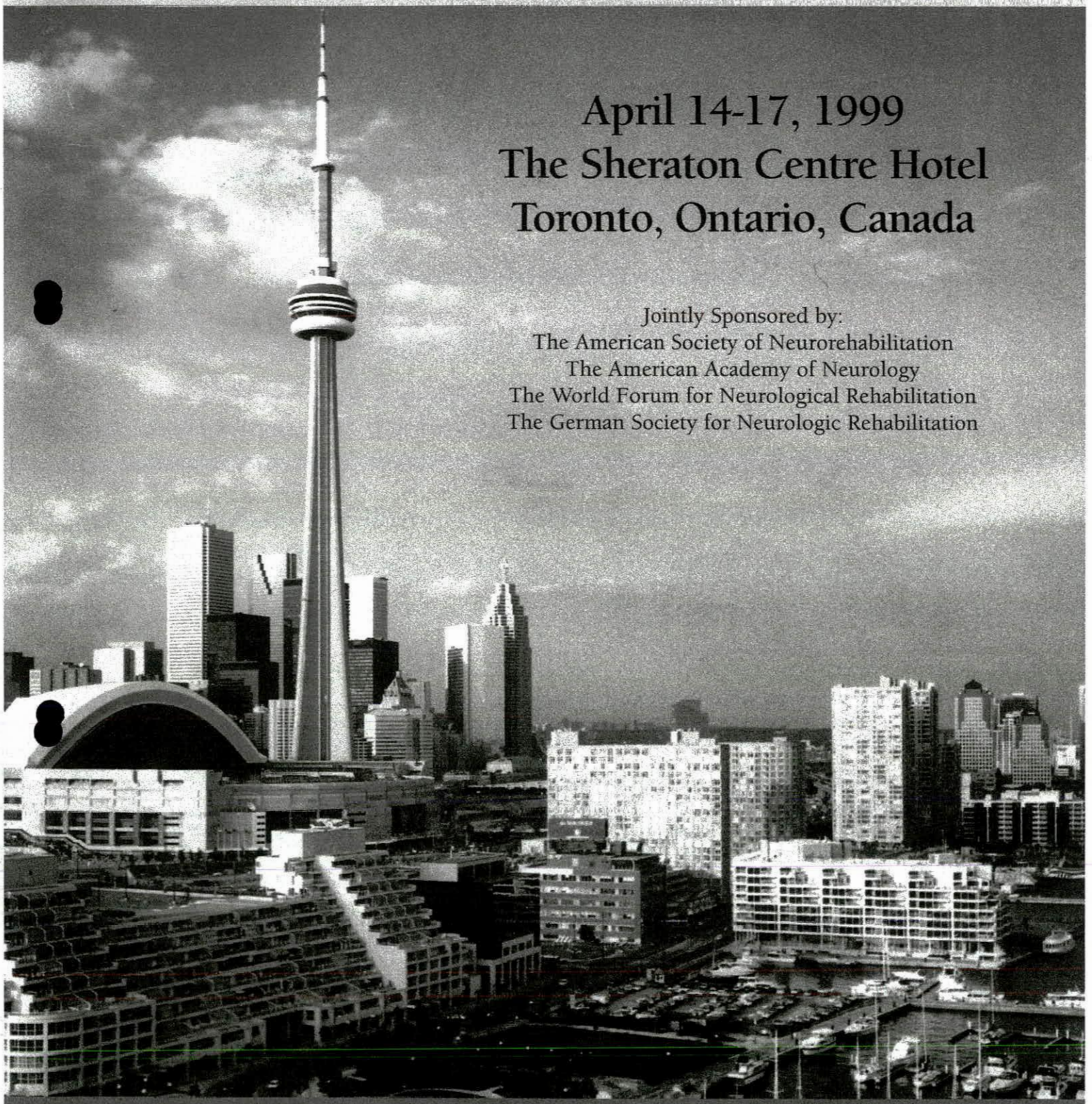

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