

7. Motor control

Common interneurons in reflex pathways from cutaneous afferents innervating different foot regions in humans— T. Komiyama¹, Y. Nishimura², T. Endoh³, T. Nakajima³, F. Tsuboi⁴ (¹ Chiba University, Fac. of Education, Japan, ² National Institute for Physiological Sciences, Japan, ³ Tokyo Gakugei, University, Japan, ⁴ Chiba University, Japan)

In the present study, we tested the hypothesis that cutaneous afferents innervating different foot regions are partly integrated in reflex pathways by common interneurons. The subjects were seven normal volunteers without neurological history. The subjects sat in a reclining arm chair, and were asked to perform weak isometric contractions of the upper leg muscles. Single motor unit activity was recorded with wire electrodes from the vastus lateralis during the contraction. The intensity of the electrical stimulation was set to 0.9–1.5 times the radiating threshold (3–5 pulses, 333 Hz). During firing of a single motor unit, the electrical stimulations to the SP, Sur and both SP and Sur (SP + Sur) were given at approximately 1 s intervals in a pseudorandom manner. Peristimulus time histograms (PSTH) were constructed with respect to each stimulation, then the cumulative sum of the mean (CUSUM) was calculated from each PSTH. In 22 of 52 units tested, the mean peak values of the short latency inhibition were found to be larger in the CUSUM obtained from the SP + Sur simulation than the simple summation in that obtained from SP and Sur stimulation. These results suggest the existence of common interneurons that integrate cutaneous input from different foot regions.

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8. Motor control

Effect of unloading to the spinal reflex pathway— K. Kobayashita, J. Shojia, N. Tanakaa, J. Ushiba, Y. Masakadoa, Y. Kagamiharab, K. Hasea, M. Liua, N. Chinoa (Department of Rehabilitation Medicine, Keio University School of Medicine, Japan; Department of Neurology, Tokyo Metropolitan Neurological Hospital, Japan)

The influence of load on the modulation of the spinal reflex was investigated in 5 healthy human subjects during treadmill walking with different body loads. The short latency reflex was evoked by stimulation of the plantar nerve and evaluated as the stimulus-induced depression of rectified soleus EMG activity (latency approximately 45 ms). Plantar nerve stimulation was applied at 1.2 times motor threshold during different phases of the step cycle with different body loads.

The short latency inhibition of soleus EMG was strongly modulated during walking as compared with tonic plantar flexion at a comparable EMG activity level. In all subjects the inhibition increased with body unloading during same phases of the step cycle.

It is concluded that load receptors are involved in the regulation of this spinal inhibitory reflex in order to adapt the locomotor pattern.

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9. Eye movement

Saccade abnormalities in Parkinson's disease— Y. Terao¹, H. Fukuda², Y. Ugawa¹, S. Tsuji¹, Y. Nomura³, M. Segawa³ (¹ Department of Neurology, University of Tokyo, Japan, ² National Institute of Industrial Health, Japan, ³ Segawa Neurological Clinic for Children, Japan)

Parkinson's disease (PD) patients are reported to be more impaired in making voluntary saccades such as memory-guided saccades (MGS) than in making reflexive saccades such as visually guided saccades (VGS). We investigated the characteristics of saccadic abnormalities in PD and also how they change with the progression of the disease. VGS and MGS performances of 18 PD patients were compared with those of 26 age-matched controls. The targets appeared randomly at 5, 10, 20, or 30 degrees to the left or right of the central fixation point. The latency of VGS was prolonged especially for saccades of larger sizes and for those towards the dominantly affected side. MGS was also prolonged in latency and hypometric for larger saccade sizes. PD patients were impaired at suppressing unwanted saccades to cues. The abnormalities deteriorated with the progression of the disease, but returned to close normal range at a later stage of PD. Thus, PD patients have difficulty in initiating both reflexive and voluntary saccades as well as in suppressing unwanted saccades. The abnormalities may be due to the excessive inhibition exerted by the indirect pathway of the basal ganglia plus the defective switching between the direct and indirect pathways.

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10. Sleep

Decreased CSF hypocretin-1 (Orexin-A) in Narcolepsy without Cataplexy— Y. Oka (Kyoto University Graduate School of Medicine, Japan)

Introduction: There is a controversy in the diagnostic criteria of narcolepsy without cataplexy. CSF hypocretin-1 is decreased in most patients with narcolepsy-cataplexy. The aim of the study was to examine whether there is a clinical difference among patients with narcolepsy without cataplexy, depending on CSF hypocretin-1 level.

Methods: Ten patients (3 male, 7 female) fulfilling the diagnostic criteria of narcolepsy without having cataplexy (International Classification of Sleep Disorders (ICSD)) were employed. Clinical features, sleep studies, and HLA typing were analyzed with CSF hypocretin-1 level.

Results: Four patients showed markedly decreased CSF hypocretin-1 (<53 pg/ml), while six showed normal level (ranged 204–356 pg/ml). Between the two groups, age of onset, ordinary sleep time and MSLT findings including mean sleep latency, number of SOREMPs and REM latency did not show any difference. HLA DR-2 was positive in all patients with low CSF hypocretin-1 while three were DR-2 positive among six patients with normal CSF hypocretin-1.

Conclusions: We were unable to reveal any statistically significant differences of clinical characteristics between the two groups. Markedly decreased CSF hypocretin-1 in addition to positive HLA DR-2 may be clinically valuable in supporting the diagnosis of narcolepsy even without cataplexy.

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