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abstracts

NEUROREHABILITATION AND SPACE NEUROLOGY DEVELOPMENT OF NEW METHODS

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Only a small part of the research in space medicine takes place under the condition of the real microgravity (space flights orbit crew). Most experiments are performed in ground based laboratories using the methods of simulated microgravity (head down tilt system, the dry water immersion model.

Functional disorders of the nervous system occur in the real as well as in the simulated micro gravity. The stimulation of the receptors for the gravity receive changed information for the afferent system to the brain, using the proprioceptive system. The proprioception is responsible for the control of the position and the movements in the human body. The human organism is adapted to the normal gravity, the human motoric is controlling the upright position and the dipod-gait.

During long-term stay in real microgravity (crew in the ISS) a disturbance in postural control occurs and musculo-sceletal failures are developing. Appropriate countermeasures of astronauts/cosmonauts are necessary to avoid the "Cosmonaut-Syndrome" (polyneuropathy, primary ,muscle atrophies, posterior column disturbances , reduction of cognitive functions and of vigilance). A quick restoration after return to the Earth is normal.

The simulated microgravity appears during long-term bed fastness developing the "Bed-Rest-Syndrome", with similar symptoms to the Cosmonaut Syndrome (polyneuropathy, primary muscle atrophy, posterior column disturbances, cognitive failures, declining in vigilance and a vegetative dysbalance). The Bed Rest Syndrome can be observed in apallic patients, severe neurological conditions
(stroke, traumatic brain injury etc.) as well as in severe cardio-vascular diseases and last not least in elderly people with a motion deficit. The origin of the Bed Rest Syndrome is the long horizontal position with a diminished influence of the normal gravity. The patho-physiological explanation of the Bed Rest Syndrome and the Cosmonaut Syndrome is the deficit in the stimulation of the proprioceptive system.

In neurorehabilitation different methods to stimulate the proprioceptive system are used like the foot sole pressure therapy with vibro stimulation methods for the foot sole (Pressure Shoe), to avoid the Bed Rest Syndrome. A new method was developed by the Russian Space Medicine, the Foot Loading Imitator (Korvit System) and the cosmonaut-trousers (Treatment Suite Regent), used spastic paresis.

The influence of the vibro tactile stimulation of the foot sole could be demonstrated with the functional MRI method, showing an increase of blood flow (BOLD Effect) in the sensomotoric areas, contra lateral and homo lateral, as well as in the thalamus, the frontal brain and the temporal lobe.

Space neurology is not only a fascinating new and pioneering research field with a special fascination, but supplies a wide range of new possibilities in neurorehabilitation.

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NEUROPROTECTION/Session 2
Chairpersons: Antonio Federico, Laszlo Vecsei

11:00-11:15	**Antonio Federico**	Diagnosis and treatment of rare neurological diseases: a challenge of neurology
11:15-11:30	**Laszlo Vecsei**	CGRP, excitotoxins and excitatotoxin antagonists in migraine
11:30-11:45	**Le-Weidong**	Folic acid and vitamin B12 therapy for ALS

Discussions 10 min

NEUROREHABILITATION
Chairpersons: Franz Gerstenbrand, Volker Hömberg

11:55-12:10	**Franz Gerstenbrand**	Neurorehabilitation and Space-Neurology
12:10-12:25	**Volker Hömberg**	Practical pharmacological projects in rehabilitation
12:25-12:40	**Dafin Mureşanu**	Understanding neuroplasticity: positive and negative outcomes
12:40-12:55	**Leontino Battistin**	Beyond the pharmacology in the recovery of stroke

Discussions 10 min