

WORLD FEDERATION OF NEUROLOGY

Applied Research Group on Space and Underwater Neurology

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Report of the Applied Research Group For Space Neurology and Underwater Neurology Subdivision Hyperbaric Oxygenation Therapy 2012

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The 3 subdivisions have different scientific projects, the main scientific activity is the research in the proprioceptive system based on the previous results in the real and the simulated microgravity with continuous input of the running scientific projects.

The Division of Space Neurology has the basis in the continuous cooperation with the Russian Space Medicine, the IBMP Moscow (Institute for Biomedical Problems). The cooperation concerns the real micro gravity and the possibility to use the different acquired data and in the cooperation with the ground based laboratory in Moscow to follow scientific programmes in the simulated micro gravity with the transfer to the experience in the clinic.

The main project in the simulated micro gravity is concentrated on the clinical examination of the Bed Rest Syndrome, the situation after a passager, respectively passive micro gravity. The scientific programme is directed to examine patients in long lasting bed rest phases or with the bed rest situation in severe brain conditions like Apallic Syndrome/Vegetative State as well in patients with the Locked In Syndrome. The symptoms acquired in an exact clinical examination programme are analyzed in detail, in combination with additional electrophysiological methods.

As a second topic disturbances of consciousness are analyzed using the fMRI system applying the vibro stimulation method of the proprioceptive system with activation of the peripheral receptors in the foot sole. This most modern method brings new information about different forms of consciousness disturbances after registration and analysis of the activated cortical areas. This programme can be used for differential diagnostic decisions and for prognostic statements.

In the neurorehabilitation new methods are introduced transferring the knowledge about the countermeasures acquired during the space flights. A programme is running for the development of new methods and new medical devices which can be used in neurorehabilitation programmes.

The Applied Research Group has enlarged the cooperation with the Adeli Medical Center in Piestany, Slovakia. This center is using Cosmonaut Trousers for the stimulation of the proprioceptive system in addition to the different methods in neurorehabilitation.

A society for the research in proprioceptive system was founded developing a common programme with the ARG of Space Neurology. A special institute for "Neurorehabilitation and Space Neurology of the Karl Landsteiner Gesellschaft" is working in a close programme cooperation with the ARG. On this basis several lectures on different European congresses are organized and realized.

The Division Underwater Neurology tries to continue the scuba diving method in neurorehabilitation. Special indications are worked out for spasticity in mild spinal cord injuries and in the various neurological complains of vertebral spine decompensation states. A cooperation with Dr.Sobotka, Neurology Salzburg, Austria is in a strategical build up state. A cooperation with scuba diving organizations and with the oil industry responsible for oil drilling platforms is missing.

The Subdivision Hyperbaric Oxygenation (HBOT) has the activities with the new installed hyperbaric oxygenation department in the Adeli Centere, Piestany, Slovakia, enlarged, using the former gathered experiences during the cooperation with the HBOT Institute in Fort Lauderdale, Florida, USA. The HBOT method in the Adeli

Center is incorporated in the neurorehabilitation programme for children with CP and other brain damages in young age. A special programme is started to treat patients with an Apallic Syndrome/Vegetative State in remission, using a combination of the various stimulation methods for the proprioceptive methods and with the HBOT.

Summarizing:

The Applied Research Group on Space and Underwater Neurology is working in a pioneer field of neuroscience research. The continuous cooperation between ARG Space and Underwater Neurology with the Russian Space Medicine and on this basis with NASA and ESA continues to provide the framework for this unique scientific field, important for acute neurology and neurorehabilitation. Beside the special results in the real micro gravity and the simulated micro gravity, including the passenger respectively passive weightlessness, new experiments with the stimulation of the proprioceptive system and the control possibility of the effect in the human cortex using the functional fMRI method offers new and highly interesting findings in acute neurology and neurorehabilitation.

Underwater Research, a problematic topic, is building up new options in neurorehabilitation using diving medicine in the special field of scuba diving. This field however is connected with extraordinary problems. Till now the cooperation with the Navy and the Oilfield Organizations is not satisfactory. Special connections would be necessary to contact scuba diving centres of both institutions.

Recommendation for the programme of the next World Conference 2013 in Vienna:

The ARG Space and Underwater Neurology, subdivision Hyperbaric Oxygenation Treatment, is proposing the topic "Proprioceptive System, Neurophysiological Background and the Use in the Treatment of various Neurological Conditions", organized as a special Work Shop. In addition a Teaching Course about "Proprioception, Special Stimulation and Control with Functional MRI for Diagnosis of Different Coma States" is proposed. As a second topic the ASG is proposing "HBOT in Modern Neurological Therapies"

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