

Movement Disturbances in Weightlessness

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The system MONIMIR has been developed to study the coordination of eye, head and arm movements as well as spinal reflexes in microgravity and was used during three spaceflights on board of the station MIR. The following investigations in the course of the experiment MONIMIR were performed: (1) slow head movements in three planes, (2,3) fast pointing movements of eyes, head and arm to acoustic and visual targets, (4) tracking movements of eyes, head and arm to visual targets, (5) head and arm movements based on short term memory and (6) patellar-tendon-reflex. In microgravity different functions and effectors showed different nature and degree of disturbance and different courses in adaptation; in most of the tests exactness and velocity of head and arm movement was decreased; head movements were more disturbed than arm movements; fast pointing movements were more severely affected than slow tracking movements which partly improved; visual controlled movements showed better adaptation as only proprioceptive controlled movements; the patellar-tendon-reflex was highly increased. Disturbances were most pronounced in the early stage of the spaceflights; at later stages most of the performances improved. Methods and results can be used not only for improvement of election and health control of cosmonauts/astronauts for future longterm space missions but also for diagnostics and research of adaptational processes in course of diseases or extreme conditions on earth.

Abstracts:

Symposium on Space Life Sciences in Austria, Vienna, Austria, December 2-3, 1992

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Session 5 (Chairpersons: J. Wetzig, J. Greenleaf):

HUMAN SENSORY PHYSIOLOGY DURING SPACEFLIGHT

invited lectures - 15 minutes + 5 minutes for discussion

- \*10.20 J. Wetzig (Johannes-Gutenberg-University Mainz): *Unusual environmental conditions and the human vestibular system*
- \*10.40 G. Clement (Toulouse): *Investigation of the vestibular system in microgravity*
- 11.00 J.P. Roll (Marseille): ?  
optional: ... (Gerstenbrand)
- 11.20 - 11.40 coffee break

Session 6 (Chairpersons: F. Gerstenbrand, N.N. (IMBP))

RESULTS FROM SOVIET-AUSTRIAN COOPERATION - PART 1

10 minutes + 5 minutes for discussion

- \*11.40 Bachl N, Baron R, Kozlovskaya I, Tschan H, Mossaheb M, Bumba W, Kharitonov I, Albrecht R, Hildebrand F, Knauf M, Witt M (Sports center, Vienna): *Development, implementation and results of a translatoric ergometric device on the MIR Space Station*
- \*11.55 Benke Th, Koserenko O, Gerstenbrand F (Univ. Clinics for Neurology, Innsbruck): *Space and cognition: The measurement of cognitive functions in microgravity*
- \*12.10 Berger M, Gerstenbrand F, Burlatschkova N, Muigg A, Grill R, De Col C, Holzmüller G, Koslovskaya I, Borisov M, Babaev B, Sokolov A, Hochmair E, Steinwender G: *Movement disturbances in weightlessness*

12.20 - 14.00 lunch

*afternoon sessions*

Session 7 (Chairpersons: N. Vana, N.N. (IMBP))

RESULTS FROM SOVIET-AUSTRIAN COOPERATION - PART 2

10 minutes + 5 minutes for discussion

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