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hypotheses that pain is induced by stretching of the spine and the paravertebral tissue or associated with reduced amplitudes and frequencies of spine motions, we developed a method which allows the continuous long-term monitoring of spine geometry (supported by the German Aerospace Center DLR). The method permits measurements in free-moving subjects without disturbing their everyday activities, work or sleep. The approach provides information about the active flexibility of the trunc, the mean spine-geometry, and its variability throughout a day or selected periods. In conjunction with pain questionnaires the data allow insight into the causes of back pain. Therefore they are also useful for the selection of adequate countermeasures. The method was applied during the following experiments on ground and inflight:

German-Russian mission MIR'97

French-Russian mission MIR'98

French-Russian mission MIR'99

CNES-DARA HDT bedrest study 97/98

CNES WHDT bedrest study 98

NASDA CNES ESA long-term bedrest study 2001-2002

Technical description

The specific hardware has been developed by the manufacturer Orthoson. The approach is based on the measurement of skin distances between four pairs of miniaturized ultrasound transmitters and receivers fixed on the back in parallel to the thoracic and lumbar spine. The instrument consists of 4 pairs of miniaturized ultrasound transmitters and receivers (diameter 23 mm, height 4 mm). They are fixed on the skin by means of adhesive tapes. For each channel the skin distance between transmitter and receiver is determined at a sound frequency of 300 kHz. For the signal the propagation velocity in soft tissue amounts to about 1500 m*s-1, independent of temperature within the physiological range. The transmitters and receivers are cable-connected to a small device, which has the following features:

- mass: 180 g
- size: 13 cm x 6 cm x 2 cm
- power supply: two 1,5 V batteries
- spatial resolution 1 mm
- measuring frequency: 1 Hz - 10 Hz per channel (adjustable)

The distance can be read directly from the device and can be stored for up to 56 h. In the latter case, the data will be transferred to a PC after cessation of the monitoring period. The device also checks the quality of skin contact of the transmitters and receivers. In case of a loose contact an acoustical signal indicates the error. The location can then be identified on the online display.

Major fields of application:

Quantification of spine flexibility

Quantification of spine movement during everyday life

Sleep analysis

Evaluation of preventive measures

Collection of basic data for rehabilitative training programs

Occupational medicine and human factors

References

Baum K., Hoy S., Essfeld D. Continuous monitoring of spine geometry: A new approach to study back pain in space. Int. J. Sports Med. 18, 1997, 331 - 333

Baum K., Essfeld D.:

Long-Term Monitoring of the Spine-Geometry during the MIR `97 Mission. Introduction of a New Method. 12th Man in Space Symposium: The Future of Humans in Space, June 8-13, 1997, Washington, D.C., 125

Baum K., Essfeld D. (1999) Origin of back pain during bedrest: A new hypothesis. Eur. J. Med. Res. 4, 389 – 393

Brain Activation Pattern of the sensorimotor cortex during stimulation of the foot with a force controllable actuator

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Abstract

PURPOSE: The aim of the study was the implementation of a vibrotactile stimulation paradigm within the MR environment in healthy volunteers to map brain activation pattern of the sensorimotor cortex during stimulation of the foot.

METHODS: 10 healthy, male volunteers performed a foot-tapping-paradigm with the right foot. In a second experimental run, the subject's sole was vibrated with a force controllable electromagnetic actuator. The vibration stimulus within a frequency range from 0-100 Hz in steps of 10 Hz was applied onto the sole of the right foot above the basic joints of the toes I–V.

All experiments were performed on a 1.5 Tesla MR-Scanner with T2*-weighted single shot echo-planar sequences. Post-processing was done with software SPM99.

RESULTS: Group analysis showed:

1.For the foot tapping paradigm (FTP) cortical brain activation within the contralateral hemisphere within the Gyrus precentralis (GPrC, MI), Gyrus postcentralis (GPoC, SI), Lobulus parietalis inferior (LPi, SII) and Gyrus cinguli (GC). Ipsilateral brain activation could be detected within the LPi, GPoC and LPs.

2.For the vibrotactile stimulation of the sole of the right foot (VPD) brain activation could be elicited contralaterally within the GPrC, GPoC, LPi, GC and Gyrus frontalis superior (GFs) and ipsilaterally within the LPi and the LPs.

CONCLUSION: In our study, we implement an MR compatible moving coil actuator, which can easily be controlled and which can be applied for detailed functional maps of the sensorimotor cortex for the lower extremities.

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