

Cortical and motor changes after reconstruction of the anterior cruciate ligament (ACL) during sensorimotor tasks

Researchers speculate about consequences at the cortical level due to a reconstruction of the anterior cruciate ligament (ACL). Therefore a measurement-inventory was developed to look synchronously at the cortical level (EEG), the neuromuscular activation (EMG) and the performance during two sensorimotor tasks in two proprioceptive modalities (joint position sense, force sensation). The aim of the study was to investigate changes in the ACL group at all three levels compared to a healthy control group, due to the task acquisition and during mental imagery of the tasks.

The findings result in the conclusion that the joint position sense is influenced at all three levels (EEG, EMG, performance) by ACL reconstructions whereas the force sensation was not affected. These results are discussed in terms of differences in focussed attention with involvement of the anterior cingulate cortex (frontal Theta) and sensory processing in the parietal somatosensory cortex (Alpha-2) as a part of a fronto-parietal network. This network seemed to represent parts of the visual-spatial working memory. That leads to speculations of measurable different loads of the working memory depending on the proprioceptive modality.