

Intra-operative identification of the subthalamic nucleus motor zone using goniometers

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The current state of the art for identification of motor related neural activity during deep brain stimulation (DBS) surgery utilizes manual movements of the patient's joints while observing the recorded raw data of a single electrode. Here we describe an intra-operative method for detection of the motor territory of the subthalamic nucleus (STN) during DBS surgery. The method incorporates eight goniometers that continuously monitor and measure the angles of the wrist, elbow, knee and ankle, bilaterally. The joint movement data and microelectrode recordings from the STN are synchronized thus enabling objective intra-operative assessment of movement-related STN activity. This method is now used routinely in DBS surgery at our institute. Advantages include objective identification of motor areas, simultaneous detection of movement for all joints, detection of movement at a joint that is not under examination, shorter surgery time, and continuous monitoring of STN activity for patients with tremor.

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