Preservation of calculation processing in brain surgery is crucial for patients' quality of life. Over the last decade, surgical electrostimulation was used to identify and preserve the cortical areas involved in such processing. Conversely, subcortical connectivity among different areas implicated in this function remains unclear, and the role of surgery in this domain has not been explored so far. The authors present the first 2 cases in which the subcortical functional sites involved in calculation were identified during right parietal lobe surgery. Two patients affected by a glioma located in the right parietal lobe underwent surgery with the aid of MRI neuronavigation. No calculation deficits were detected during preoperative assessment. Cortical and subcortical mapping were performed using a bipolar stimulator. The current intensity was determined by progressively increasing the amplitude by 0.5-mA increments (from a baseline of 1 mA) until a sensorimotor response was elicited. Then, addition and multiplication calculation tasks were administered. Corticectomy was performed according to both the MRI neuronavigation data and the functional findings obtained through cortical mapping. Direct subcortical electrostimulation was repeatedly performed during tumor resection. Subcortical functional sites for multiplication and addition were detected in both patients. Electrostimulation interfered with calculation processing during cortical mapping as well. Functional sites were spared during tumor removal. The postoperative course was uneventful, and calculation processing was preserved. Postoperative MRI showed complete resection of the tumor. The present preliminary study shows for the first time how functional mapping can be a promising method to intraoperatively identify the subcortical functional sites involved in calculation processing. This report therefore supports direct electrical stimulation as a promising tool to improve the current knowledge on calculation processing connectivity [1)].

1)

Della Puppa A, De Pellegrin S, Lazzarini A, Gioffrè G, Rustemi O, Cagnin A, Scienza R, Semenza C. Subcortical mapping of calculation processing in the right parietal lobe. J Neurosurg. 2014 Nov 21:1-4. [Epub ahead of print] PubMed PMID: 25415072.