

Insular glioma surgery planning

- Potential predictors of awake surgery failure for insular glioma
- Sudden Loss of Motor-Evoked Potentials (MEPs) During the Resection of A Nondominant Insular Glioma: Case Report and Management Review
- Navigated Transcranial Magnetic Stimulation and Diffusion Tensor Imaging Tractography in Insular Glioma Surgery
- Microsurgical anatomy and approaches to thalamic gliomas. Part 2: Maximal safe resection of thalamic gliomas improves outcomes. A single-center experience
- Neuropsychological Evaluation and Functional Magnetic Resonance Imaging Tasks in the Preoperative Assessment of Patients with Brain Tumors: A Systematic Review
- Non-traditional cognitive brain network involvement in insulo-Sylvian gliomas: a case series study and clinical experience using Quicktome
- Combined use of intraoperative MRI and awake tailored microsurgical resection to respect functional neural networks: preliminary experience
- Awake craniotomy for operative treatment of brain gliomas - experience from University Medical Centre Ljubljana

Preoperative Planning

- **High-resolution MRI** with **DTI** (tractography)
- **Functional MRI** or **MEG** for eloquent cortex mapping
- **Awake craniotomy** with **cortical and subcortical stimulation mapping** if tumor is near language or motor areas
- **Neuronavigation** and intraoperative **ultrasound** or **MRI**

Preoperative assessment and selection of the approach

In preoperative [planning](#), in addition to structural MRI, functional MRI (fMRI) and diffusion tensor imaging (DTI) tractography can provide a three-dimensional anatomical perspective of the tumor and surrounding eloquent cortex and white matter tracts. On the cortical level, despite establishing the dominant hemisphere in terms of language function with the use of fMRI, identification of motor-, sensory-, or visual-related cortices within the frontal, parietal, and occipital lobes can be achieved. The relationship of the tumor to white matter tracts can be established with the use of DTI tractography. Despite technical advancements, both fMRI and DTI still present some drawbacks that make direct brain stimulation the gold standard in the intraoperative identification of eloquent regions at the cortical and subcortical levels. The limitations of MRI techniques are related to parenchymal invasion, pathological angiogenesis, and disturbed neurotransmitter concentrations due to glioma invasion ^{1) 2)}.

1)

Giussani C, Roux FE, Ojemann J, Sganzerla EP, Pirillo D, Papagno C. Is preoperative functional magnetic resonance imaging reliable for language areas mapping in brain tumor surgery? Review of language functional magnetic resonance imaging and direct cortical stimulation correlation studies. *Neurosurgery*. 2010 Jan;66(1):113-20. doi: 10.1227/01.NEU.0000360392.15450.C9. PMID: 19935438.

2)

Przybylowski CJ, Hervey-Jumper SL, Sanai N. Surgical strategy for insular glioma. *J Neurooncol*. 2021

Feb;151(3):491-497. doi: 10.1007/s11060-020-03499-4. Epub 2021 Feb 21. PMID: 33611715; PMCID: PMC8012000.

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