

BRAINSUITE® IMRI APPLICATIONS

BrainSUITE iMRI reduces costs and improves patient care in a wide range of clinical applications. Verified neurosurgical applications include:

- Glioma resection
- Pituitary tumor surgery
- Complicated tumor resection
- Epilepsy surgery
- Intra-cranial cyst surgery
- Biopsy with and without a frame
- Catheter placement
- Vascular surgery
- Functional imaging

Advantages of iMRI

High-field iMRI with 1.5 T provides superior image quality. Cutting edge gradient and magnet technology guarantee short acquisition time and a large field of view. Additionally it enables the surgeon also to perform the following advanced MR sequences:

MR angiography (MRA) is used to image blood vessels for diagnosis and treatment of heart disorders, stroke and blood vessel diseases. Advanced techniques like 2D and 3D Time-of-Flight MRA or 2D and 3D Phase Contrast (PC) MRA use the blood itself or signal changes induced by blood flow as intrinsic contrast agent. For diagnosis of aneurysmal disease, poor cardiac output or tortuous vessels contrast enhanced angiographies can be performed intraoperatively.

Functional MRI (fMRI) reflects oxygen consumption of active brain areas and thus enables physicians to look into the human brain in vivo (“while it works”). Identifying eloquent areas during surgery, even if they are shifted or dislocated, is one of the most important challenges of intra-operative fMRI.

MR-Spectroscopy - Single- and Multi-Voxel MRS provide information about the chemical properties of the tissue. Advanced techniques of H-1 Spectroscopy can be used to detect peaks e.g. from NAA, choline containing compounds, creatine and creatine-phosphat, myo-inositol and lactate. Abnormal concentrations of these metabolic compounds are related to distinct diseases. MR-Spectroscopy allows the neurosurgeon to generate metabolic maps that provide detailed spatial information of these compounds and thus pathologic tissue distribution.

Diffusion Tensor Imaging (DTI) is a powerful tool to determine the arbitrary movement of water molecules in all three dimensions. DTI measurements of at least 6 spatial directions can be used to calculate the diffusion tensor. Since oriented tissue such as neuron-fibres define preferred paths and restrict arbitrary movement, DTI can be used to visualize neuronal fiber pathways in the human brain.