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# MR-guided laser interstitial thermal therapy in the treatment of brain tumors and epilepsy

Silas Haahr Nielsen <sup>1</sup>, Rune Rasmussen <sup>2</sup>

Affiliations

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## Abstract

MR-guided Laser Interstitial Thermal Therapy (MRgLITT) is a minimally invasive neurosurgical technique increasingly used for the treatment of drug-resistant epilepsy and brain tumors. Utilizing near-infrared light energy delivery guided by real-time MRI thermometry, MRgLITT enables precise ablation of targeted brain tissues, resulting in limited corridor-related morbidity and expedited postoperative recovery. Since receiving CE marking in 2018, the adoption of MRgLITT has expanded to more than 40 neurosurgical centers across Europe. In epilepsy treatment, MRgLITT can be applied to various types of focal lesional epilepsy, including mesial temporal lobe epilepsy, hypothalamic hamartoma, focal cortical dysplasias, periventricular heterotopias, cavernous malformations, dysembryoplastic neuroepithelial tumors (DNET), low-grade gliomas, tuberous sclerosis, and in disconnective surgeries. In neuro-oncology, MRgLITT is used for treating newly diagnosed and recurrent primary brain tumors, brain metastases, and radiation necrosis. This comprehensive review presents an overview of the current evidence and technical considerations for the use of MRgLITT in treating various pathologies associated with drug-resistant epilepsy and brain tumors.

**Keywords:** Brain tumors; Drug-resistant epilepsy; Epilepsy surgery; LITT; MR-guided Laser Interstitial Thermal Therapy; MRgLITT; Minimally invasive surgery; Neuro-oncology; Pediatric neurosurgery; SLA; Stereotactic Laser Ablation.

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