

Laser Interstitial Thermal Therapy (LITT)

Laser Interstitial Thermal Therapy (LITT) is a minimally invasive neurosurgical technique that uses laser-induced heat to thermally ablate intracranial or spinal lesions under real-time magnetic resonance imaging (MRI) guidance.

While MRI is not absolutely required, effective and safe LITT—especially in the brain—relies on real-time MRI guidance. Alternative imaging lacks the precision and feedback necessary for delicate intracranial procedures.

Magnetic resonance image-guided laser interstitial thermal therapy.

[Magnetic resonance image-guided laser interstitial thermal therapy](#)

□ Mechanism of Action

- A **laser fiber** is inserted stereotactically into the target lesion. - The laser emits **infrared energy**, which heats and destroys tissue via **coagulative necrosis**. - **MRI thermometry** is used during the procedure to monitor temperature distribution in real time and ensure precise thermal ablation while avoiding damage to adjacent healthy tissue.

□ Clinical Applications

- **Brain metastases** (especially post-radiation or deep-seated) - **Radiation necrosis** - **Gliomas** (low- and high-grade) - **Epilepsy surgery** (e.g., mesial temporal lobe sclerosis) - Occasionally used in **spinal tumors** and **abscesses**

⚖ Advantages

- Minimally invasive (percutaneous) - Real-time thermal monitoring - Shorter recovery compared to open surgery

⚠ Limitations

- Not suitable for large or irregularly shaped lesions - Risk of thermal injury to nearby eloquent structures - Lack of long-term randomized controlled trial data for many indications

□ Synonyms

- Stereotactic laser ablation - MR-guided laser interstitial therapy (MRgLITT)

□ Tag: `LITT` `minimally_invasive` `thermal_ablation` `neurosurgery`

From:
<https://neurosurgerywiki.com/wiki/> - **Neurosurgery Wiki**

Permanent link:
https://neurosurgerywiki.com/wiki/doku.php?id=laser_interstitial_thermal_therapy

Last update: **2025/06/16 13:44**

