MR GUIDED FOCUSED ULTRASOUND (MRgFUS)

Non-invasive thalamotomy for movement disorders & pain
INSIGHTEC the global leader in Magnetic Resonance guided Focused Ultrasound (MRgFUS) has developed ExAblate Neuro, a therapy platform that is transforming medicine. MRgFUS presents a non-invasive alternative for deep brain procedures that combines two proven technologies - focused ultrasound and magnetic resonance imaging (MRI) with real-time feedback. CE approved applications of MRgFUS in Europe include thalamotomy and pallidotomy for essential tremor, tremor dominant Parkinson’s Disease and neuropathic pain.

INSIGHTEC’s Neurosurgery solution enables the physician to create a highly accurate and controllable lesion offering personalized treatment through an intact skull with no ionizing radiation. Importantly, sub-therapeutic dosing of ultrasound allows for refinement of targeting based on patient specific intraoperative physiology prior to final treatment. No probes are required to penetrate the brain tissue, ensuring minimal risk of bleeding, no risk of infection and short patient recovery time. In a single session performed with no anesthesia or sedation, patients show immediate, life changing, results.

Minimal hospitalization, no need for an operating room and no implanted hardware offer an economical solution for a hospital or a clinic. INSIGHTEC is proud to be collaborating with leading centers around the world to bring this important step in the evolution of surgery to a future standard of care.
VALUE OF MRgFUS NEUROSURGERY

PHYSICIAN & CLINICAL VALUE
- Completely non-invasive; no penetrating trajectories
- No ionizing radiation
- Real time MRI for targeting
- Real time thermal feedback
- Intra-operative physiologic feedback
- Sharp, accurate, lesions as small as 2mm

PATIENT VALUE
- No implanted hardware
- Immediate results
- Less risk of infection
- Single session treatment with no anesthesia
- Short recovery time, with minimal hospitalization

ECONOMIC VALUE
- Little to no hospitalization period
- Attract and treat additional patient groups
- Strengthen hospital/clinic leadership in innovation and advanced care
CLOSED-LOOP THERAPY, REAL-TIME FEEDBACK

The closed loop feedback and control is key to ensuring safe and effective treatment. It enables physicians to know at any point during treatment what has been treated, the thermal effects, if changes are required and the immediate treatment outcome.

1. PLANNING
   Standard stereotactic planning from MRI

2. ANATOMIC VERIFICATION
   Real-time thermal feedback for target verification

3. PHYSIOLOGIC VERIFICATION
   Intra operative physiologic testing for final target refinement

4. ADJUSTMENT
   Parameters adjusted as necessary to ensure safe and effective response

Disclaimer: The above figures are not representative of future treatments.
ELIAS WJ, ET AL., A PILOT STUDY OF FOCUSED ULTRASOUND FOR ESSENTIAL TREMOR.


This study investigated the use of transcranial MRI-guided focused ultrasound thalamotomy for the treatment of essential tremor. In an open-label prospective study, transcranial MRI-guided focused ultrasound was used to target the unilateral ventral intermediate nucleus of the thalamus in 15 patients with severe, medication refractory essential tremor. Following the treatment with MRI-guided focused ultrasound, essential tremor improved in all 15 patients and was maintained through one year with an expected adverse event profile.

LIPSMAN N, ET AL., MR-GUIDED FOCUSED ULTRASOUND THALAMOTOMY FOR ESSENTIAL TREMOR: A PROOF-OF-CONCEPT STUDY.

*The Lancet Neurology, Volume 12, Issue 5, May 2013*

This study examined the application of MR-guided focused ultrasound to the management of essential tremor. Four patients with chronic and medication-resistant essential tremor were treated with MR-guided focused ultrasound to ablate tremor-mediating areas of the thalamus. The authors concluded that MR-guided focused ultrasound may be a safe and effective approach to generation of focal intracranial lesions for the management of disabling, medication-resistant essential tremor.
PAPER REVIEW: ESSENTIAL TREMOR STUDY 1

PATIENT INFORMATION
15 patients suffering from severe medication-refractory essential tremor underwent a unilateral VIM thalamotomy with INSIGHTEC Neuro.

OUTCOME
- After 12 months, patients reported a 75% improvement in the tremor on the treated side and 85% improvement in disability.
- 80% of patients reported an improvement between baseline and follow-up.
- Four patients had persistent paresthesias at 12 months with 3 mild and one moderate.

PAPER REVIEW: ESSENTIAL TREMOR STUDY II 2

PATIENT INFORMATION
4 patients also suffering from severe, medication-refractory essential tremor were treated with INSIGHTEC Neuro.

OUTCOME
- Patients showed immediate and sustained improvements in tremor in the dominant hand.
- Mean reduction in tremor score of the treated hand was 89.4% at 1 month and 81.3% at 3 months.
- One patient had postoperative paraesthesias at 3 months and one developed a deep vein thrombosis.

PAPER REVIEW: PARKINSON’S DISEASE STUDY ³

PATIENT INFORMATION

13 Patients suffering from Parkinson’s Disease underwent a thalamotomy (pallido-thalamic-tractotomy, PTT) with INSIGHTEC Neuro.

OUTCOME

▪ After 3 months patients showed a 61% mean UPDRS improvement and a mean global symptom relief of 57%.
▪ Their PTT lesions were clearly visible on 3 month MRI.
▪ The mean absolute targeting accuracy was 0.5 mm for the mediolateral, 0.5 mm for the anteposterior and 0.6 mm for the dorsovenral dimension.

PAPER REVIEW: NEUROPATHIC PAIN STUDY ⁴

PATIENT INFORMATION

In 11 patients suffering from chronic therapy-resistant neuropathic pain, a central lateral thalamotomy was performed with INSIGHTEC Neurosurgery.

The treated neuropathic pain syndromes had peripheral (5 patients) or central (6 patients) origins and covered all body parts (face, arm, leg, trunk and hemibody).

OUTCOME

▪ Patients experienced mean pain relief of 49% at the 3-month follow-up and 57% at the 1-year follow-up.
▪ Mean improvement according to the visual analog scale amounted to 42% at 3 months and 41% at 1 year.
▪ Six patients experienced immediate and persisting somatosensory improvements.
▪ There was 1 hemorrhagic complication leading to the introduction of a cavitation detector in subsequent treatments.

¹ Images courtesy of Jin Woo Chang, MD, PhD, Yonsei University College of Medicine, Seoul, Korea, Jeff Elias, MD, PhD, University of Virginia, Charlottesville, Virginia, USA, Daniel Jeanmonod, MD, PhD, SoniModul, Solothurn, Switzerland.
## A Growing Portfolio of Clinical Indications

### Women’s Health
- Adenomyosis approved in Europe (2010) and Korea (2011)

### Oncology
- Pain Palliation of Metastatic Bone Tumors approved in Europe (2007) and US (2012)
- Benign Bone Tumors approved in Europe
- Osteoid Osteoma approved in Europe
- Facet Rhizotomy approved in Europe

### Neurosurgery
- Essential Tremor approved in Europe
- Tremor Dominant Parkinson’s Disease approved in Europe
- Neuropathic Pain approved in Europe

### Future Applications

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**About Insightec**

INSGHTTEC is the global leader in MRgFUS. The company, founded in 1999, develops and distributes ExAblate, a non-invasive therapy platform that is transforming medicine. INSIGHTEC is continuously expanding its applications ranging from functional neurosurgery to oncology and gynecology. MRgFUS is embraced by world renowned physicians in more than 120 medical facilities who applaud both its clinical and economic value.

The company has received numerous innovation awards, among others from the Wall Street Journal and TIME magazine. INSIGHTEC is privately held by GE Healthcare, Elbit Imaging, York Capital Management, GEOC Hengtong Investment Limited Partnership and MediTech Advisors.

For more information please visit: [www.insightec.com](http://www.insightec.com)

**Contact**

**Corporate Headquarters**

INSIGHTEC Ltd.
5 Nachum Heth St.
POB 2059
Tirat Carmel 3912001
Israel
Tel: +972 4 813 1313