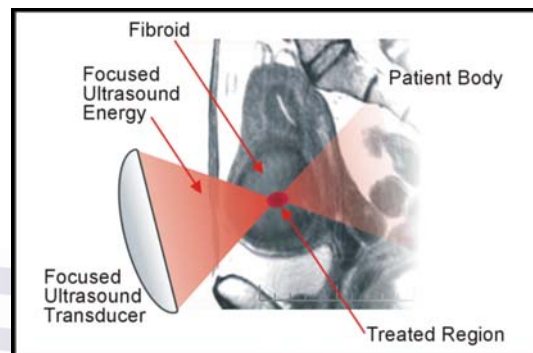


Magnetic Resonance guided Focused Ultrasound Surgery (MRgFUS)

Magnetic Resonance guided Focused Ultrasound Surgery (MRgFUS) is a noninvasive, outpatient, surgical procedure that uses high-intensity focused ultrasound waves to ablate (destroy) tissue in combination with Magnetic Resonance Imaging (MRI), which guides, monitors, and controls treatment.

How MRgFUS works

- Ultrasound is a form of energy that can pass through skin, muscle, fat and other soft tissues. Low-intensity ultrasound waves (used for diagnostic imaging) have no biologic effect on cells or tissues.
- High-intensity ultrasound energy focused on a small target volume raises the tissue temperature high enough to destroy it. This is similar to the manner in which sunlight focused by a magnifying glass can create sufficient heat to start a fire. The use of heat to destroy tissue is called thermal ablation.



History of FUS

- The first study to show that focused ultrasound could have a biologic effect on tissue was conducted in 1926.
- Research in this area has continued for nearly eight decades, and there are extensive data in both animal and human studies evaluating the potential use and safety of focused ultrasound.
- Initially, focused ultrasound was evaluated primarily for diseases such as Parkinson's disease and other brain-related disorders because it provided an approach for destroying diseased tissue from the brain without the need to conduct invasive surgery.
- Human trials are underway for breast, liver, brain and bone cancer.
- The first U.S. Food and Drug Administration (FDA) approval was granted to ExAblate® 2000 for the treatment of uterine fibroids. It is the only FDA approval for any focused ultrasound application.

Magnetic Resonance guided Focused Ultrasound

- Magnetic Resonance guided Focused Ultrasound uses a magnetic resonance imaging (MRI) scanner to identify tissues in the body and plan the treatment. During the procedure, delivery of focused ultrasound energy is guided and controlled using MR thermal imaging.
- MR imaging provides a three-dimensional view of the target tissue, allowing for precise focusing of ultrasound energy within a desired volume.
- Additionally, the MR imaging provides quantitative, real-time, thermal images of the treated area. This allows the physician to ensure that the temperature generated during each cycle of ultrasound energy is sufficient to cause thermal ablation within the desired tissue and if not, to adapt the parameters.

How Magnetic Resonance guided Focused Ultrasound differs from ultrasound guided Focused Ultrasound

- MR imaging supersedes ultrasound imaging by its superior tissue differentiation. This enables the physician to identify the tumor and surrounding organs with high precision.
- MR is the only imaging modality that allows temperature changes in the body to be monitored.
- ExAblate works exclusively with GE MR.
- ExAblate is the only MR guided Focused Ultrasound to be approved by the FDA.

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