

## Focused Ultrasound Guided by MRI

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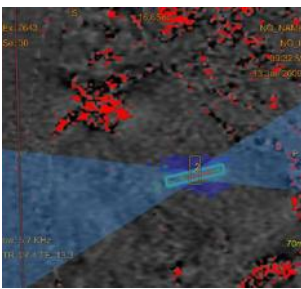
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### Introduction

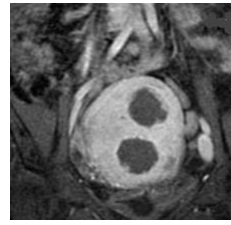
I will be covering MR guided Focused Ultrasound (MRgFUS). This is a surgical technique which destroys target cells without any damage to the outer surface of the skin. This can be used to treat a variety of cancers as well as movement diseases such as Parkinson's or Essential Tremor.

### Method

The patient is placed in a MRI machine where the target area is identified in 3 dimensions. And the path of the ultrasound can be visualized.



Next the doctor does a test run to make sure the target area is correct. The ultrasound heats up the target region. During the test the power is low so no damage is done. The temperature is tracked in real time so the doctors can make sure the aim is right. Next the actual treatment begins and the beam moves around within the target area, destroying the cells with heat.



(The dark spots are the destroyed target areas.)

### Results

Using this treatment removes the problem areas without having to take out large portions of the organ. This is great for diseases like breast or prostate cancer. It also makes treatment of movement diseases safer and more repeatable. These can't be healed but this treatment is better than many alternatives. The use of MRgFUS to treat Systematic Uterine Fibroids removes the pain while still allowing those treated to have children; whereas the old treatment would remove the pain but also remove the ability to reproduce.

### Discussion

The ability to do non-invasive surgery removes most of the risk of infection and hemorrhaging as well as keeping the surface skin intact. This treatment doesn't have the risks of some radiation based treatments so it can be repeated as many times as needed. The recovery time for MRgFUS surgery is shortened by the fact that there are no cuts. Also the ability to have children again is a great thing.

### Resources

<http://www.insightec.com/MRgFUS-Technology.html>  
[http://www.uterine-fibroids.org/mr\\_guided.html](http://www.uterine-fibroids.org/mr_guided.html)  
[http://www.insightec.com/Essential\\_Tremor.html](http://www.insightec.com/Essential_Tremor.html)  
[http://www.medscape.com/viewarticle/721315\\_1](http://www.medscape.com/viewarticle/721315_1)  
<http://movies.netflix.com/WiPlayer?movieid=70232704&trkid=3326878&t=TEDTalks%3A+Doctors+on+the+Cusp%3A+Yoav...>