YOUR HEALTH

How Highly Focused Sound Waves Steadied A Farmer's Trembling Hand

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Heard on Morning Edition

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Transcript

Alan Dambach developed tremors that caused his hands to shake uncontrollably. His condition made it difficult to work on his family's tree farm in Fombell, Pa.

Ross Mantle for NPR

Alan Dambach was in his late 50s when he noticed how unsteady his hands had become.

Over the next decade, his tremor got so bad he had difficulty eating with a spoon or fixing equipment at his family's tree farm in Western Pennsylvania.

"I couldn't get nuts and bolts to work," he says.

But it was his deteriorating handwriting that made Dambach decide he had to do something about his tremor.

"My signature was so bad, and my writing was just atrocious," he says. "One day I was over at our business and I was writing an order. And one of my foremen said, 'Why don't you let me write that for you?' "

Dambach's problem wasn't a disease, like Parkinson's. He had simply inherited genes that made his hands increasingly shaky as he got older. The condition is called essential tremor or familial tremor, and it affects more than 7 million people in the U.S.

Dambach tried drugs, which helped temporarily. He also considered surgery to implant a device called a deep brain stimulator.

But he didn't like the idea of an implanted device, or having wires run from his chest to his brain. "I thought: No way," he says. "This isn't going to work for me. I'm still too active."

Dambach decided to try a treatment at the University of Maryland Medical Center called focused ultrasound. The procedure sends sound waves directly to the part of the brain affecting his motor skills.

Ross Mantle for NPR

Then Dambach heard about a new treatment that uses sound waves to reduce tremors without traditional surgery. It's called focused ultrasound, and it was approved by the Food and Drug Administration in 2016. But the treatment is only now becoming available at more than a handful of medical centers.

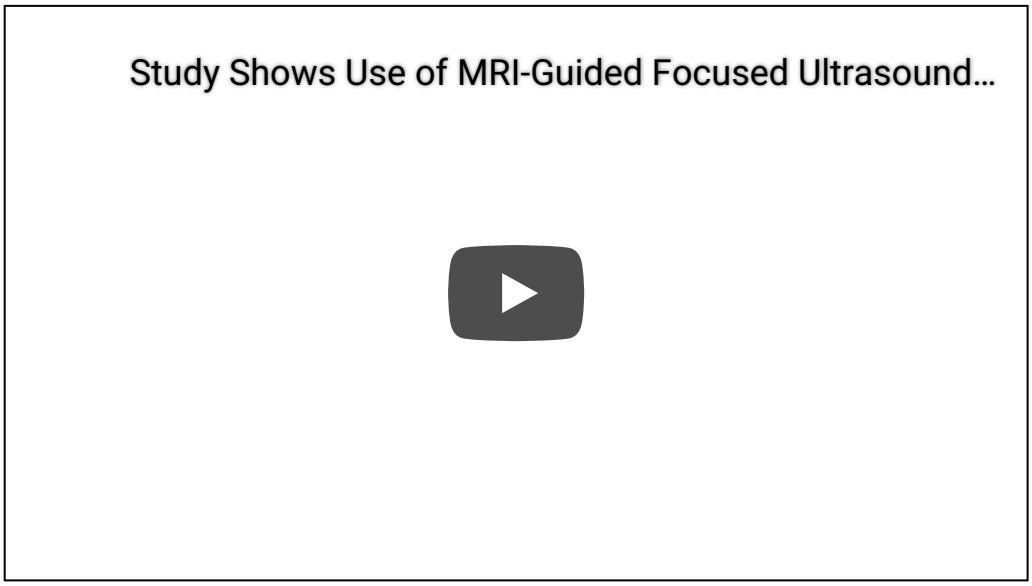
Dambach was referred to Dr. Howard Eisenberg, chair of neurosurgery at the University of Maryland Medical Center in Baltimore. And Eisenberg says Dambach's history is pretty typical of the people he treats.

"These people don't have just a tremor," he says. "It's a disabling tremor. These are people who've had to actually change their lives."

Focused ultrasound reduces tremor by sending high-frequency sound waves right through the skull to destroy specific areas of brain tissue. It's an outpatient procedure, but not a trivial one, Eisenberg says.

"Heating up part of your brain and killing brain cells seems invasive to me," Eisenberg says. "But it doesn't have the same feeling to patients as surgery. There are no incisions. You don't go to the operating room."

Instead, patients are placed in an MRI scanner, which allows doctors to figure out which brain areas to zap. Then they are fitted with a helmetlike device that can focus sound waves on those areas.



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During Dambach's treatment, Eisenberg and his team would administer a burst of ultrasound, and then bring him out of the MRI tube to see how he was doing.

"They gave me a bottle of water to pretend I was drinking," he says. "And every time I came out it shook less."

Studies show the treatment generally reduces tremors by at least half. Dambach saw his all but disappear.

But any substantial reduction can be life changing, says Charlene Aldrich, a researcher who works with Eisenberg at the University of Maryland.

She shows me several patients' efforts to trace a circular pattern with a pen before and after the treatment.

"You can see here they cannot draw a circle," Aldrich says, pointing to scribbles that look almost random. "And here they follow the lines like you and I would do," she says.

Focused ultrasound isn't the right treatment for everyone.

So far, it is only being used to treat one side of the brain, which means it can only reduce the tremor in one hand. Also some people can't be treated at all because their skulls absorb too much of the sound energy.

And, there are risks. Some patients experience numbness or problems with balance afterward.

Finally, even though the procedure is approved by the FDA, many insurers still don't cover the cost, which is about $40,000. Medicare covers the procedure in some states, but not others.

After undergoing focused ultrasound, Dambach is no longer affected by tremors in his right hand. He continues to show some signs of shaking in his left hand.

Ross Mantle for NPR

For Dambach, though, focused ultrasound was the right call.

He says by the end of the procedure, which took hours, he was exhausted.

"But the next day, I had to take the payroll to the banks and I had to sign them," he says. "I just was so happy. My signature was back."

That was more than a year ago, and Dambach says his signing hand is still rock steady.

So far, more than 1,000 essential tremor patients around the world have been treated with focused ultrasound, says Maurice Ferré, CEO of Insightec, the company that makes the device used to treat Dambach.

That number is likely to increase as more centers in the U.S. begin offering the procedure and more states approve Medicare payment for it. Right now, Medicare covers the treatment in 16 states, though coverage is pending in many more, Ferré says.

Insightec plans to begin testing ultrasound treatment on both sides of the brain in tremor patients in the U.K. later this year, Ferré says. The goal is to reduce tremor in both hands, instead of just one.

And in the U.S. the company is already testing the technology's ability to treat tremors in Parkinson's patients, Ferré says.

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