A young woman with blonde hair in a ponytail, wearing a blue denim shirt and sunglasses on her head, has her right hand on the shoulder of an elderly woman. The elderly woman has short, wavy grey hair and is wearing a white top with a colorful floral pattern and a necklace. Both women are smiling and looking at each other. The background is a blurred indoor setting, possibly a kitchen or living area.

# **MRI Guided Focused Ultrasound Thalamotomy for Essential Tremor**

# **Andrew Conner, M.D.**

## **Neurosurgeon @ OU Health**

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### **AGENDA**

- 1. Fundamentals / Indications**
- 2. Options**
- 3. Procedure Description**
- 4. Outcomes**
- 5. Side Effects**
- 6. Other Considerations**
- 7. Patient Examples**
- 8. Conclusion**

# Essential Tremor

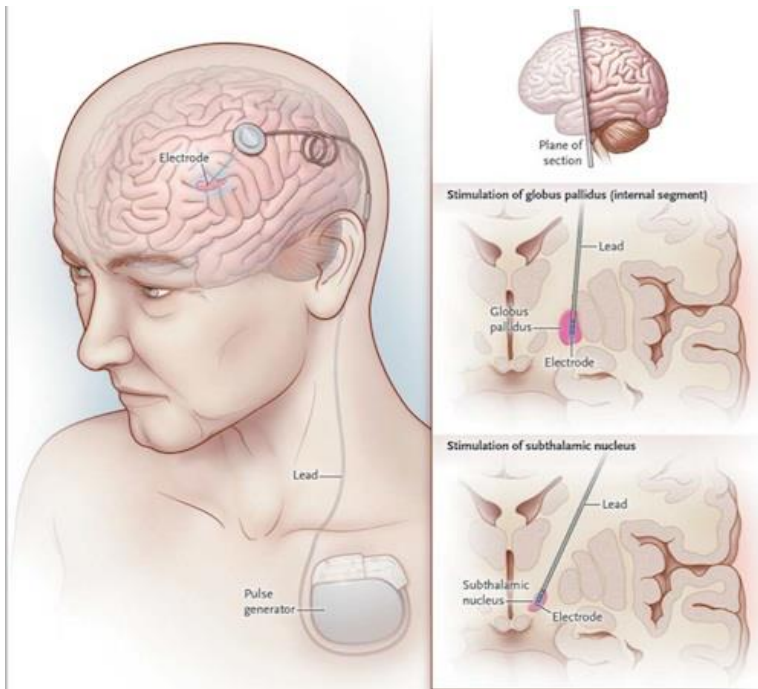
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- Movement disorder that causes tremor with *action*
- Commonly runs in families
- Roughly **7 million** people in the United States suffer from Essential Tremor.
- This is approximately **2.2%** of the total population
- Medications such as Propranolol and/or Primidone are commonly used to help

# Essential Tremor

- When medications, such as Propranolol and/or Primidone fail to control the tremor, surgical options exist:

## Deep Brain Stimulation



## Lesioning

- RF Ablation (Requires incision and physical probe in the brain)
- LITT Ablation (Requires incision and physical probe in the brain)
- Gamma Knife (No incision, delayed result, uses radiation)
- MRI Guided Focused Ultrasound (No incision, immediate result, uses soundwaves)

# Essential Tremor

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## MRI Guided Focused Ultrasound (FUS)

- Outpatient
- No Anesthesia
- No incision
- Instant result



# Essential Tremor

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## MRI Guided Focused Ultrasound (FUS)

- Requires complete head shave
- Requires 4 “numbing shots” on the scalp
- Requires 4 temporary small pin placement in the front and back



# Essential Tremor

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## Who is a candidate?

- Diagnosis of Essential Tremor
- Medications no longer working
- Tremor disabling
- Can have an MRI
- Pass screening CT Scan (“SDR”)



# Essential Tremor

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## How does it work?

- Focuses ~1000 harmless ultrasound waves to a specific area of the Thalamus
- Target is “tested” at low power
- If tremor is improved and there are no side effects, the power is increased and the lesion is made.
- Scalp is cooled with deionized sterile water





## How good is it really?

JNS

CLINICAL ARTICLE

### **Magnetic resonance imaging–guided focused ultrasound thalamotomy for essential tremor: 5-year follow-up results**

G. Rees Cosgrove, MD,<sup>1</sup> Nir Lipsman, MD, PhD,<sup>2</sup> Andres M. Lozano, MD, PhD,<sup>3</sup>  
Jin Woo Chang, MD, PhD,<sup>4</sup> Casey Halpern, MD,<sup>5</sup> Pejman Ghanouni, MD, PhD,<sup>6</sup>  
Howard Eisenberg, MD,<sup>7</sup> Paul Fishman, MD, PhD,<sup>8</sup> Takaomi Taira, MD, PhD,<sup>9</sup>  
Michael L. Schwartz, MD, MSc,<sup>2</sup> Nathan McDannold, PhD,<sup>10</sup> Michael Hayes, MD,<sup>11</sup>  
Susie Ro, MD,<sup>12</sup> Binit Shah, MD,<sup>13</sup> Ryder Gwinn, MD,<sup>14</sup> Veronica E. Santini, MD, MA,<sup>15</sup>  
Kullervo Hynynen, PhD,<sup>16</sup> and W. Jeff Elias, MD<sup>17</sup>

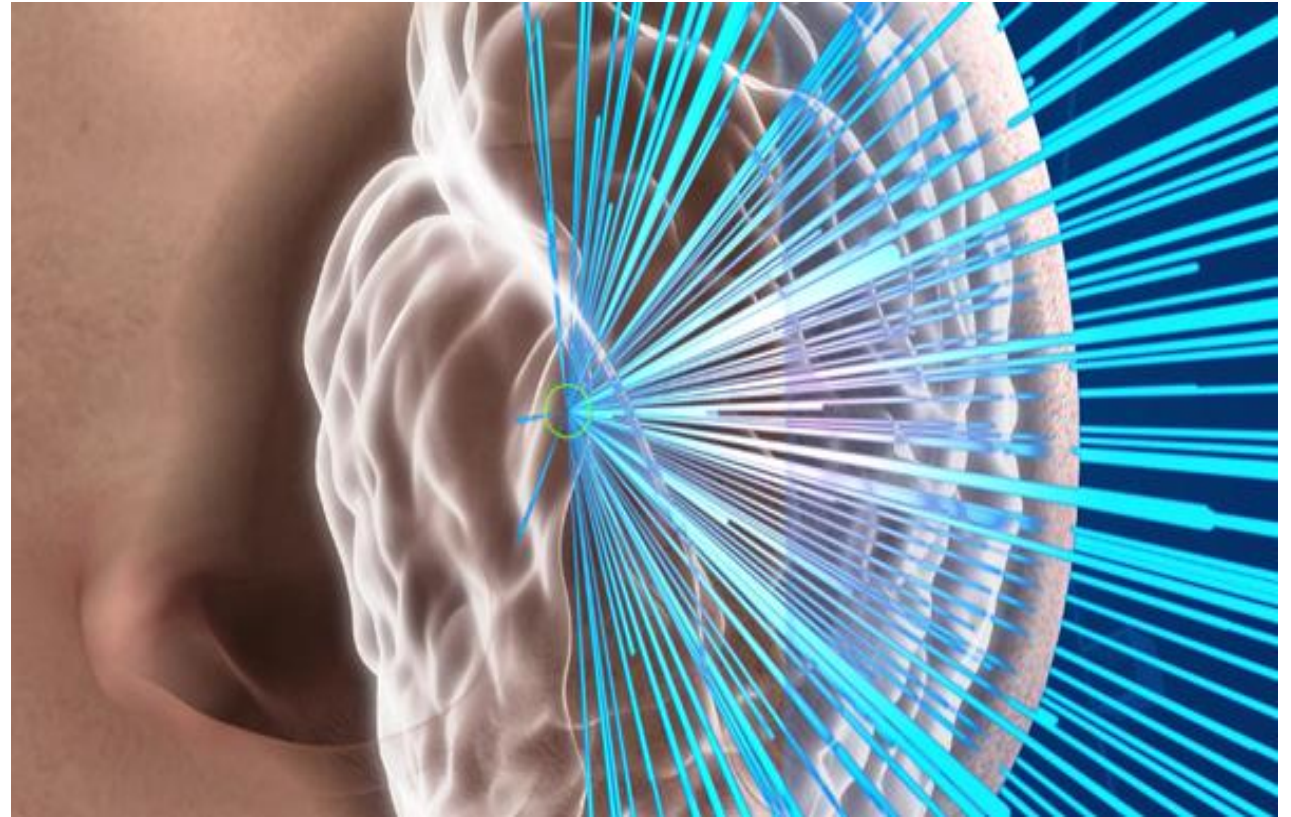
- **55-65% Reduction in Tremor @ 5 years**

# Essential Tremor

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## Are there risks?

- Imbalance
- Numbness/Tingling
- Weakness
- **Very Uncommon to have long-term issues.**
- **Most side effects resolve within a few weeks**



# Essential Tremor

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## Bilateral Tremor

- One side treated at a time
- Must wait at least 9 months in between treatments



# Essential Tremor

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What if it doesn't last or work?

- Can re-treat
- Consider DBS



# Essential Tremor

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## OU Health experience



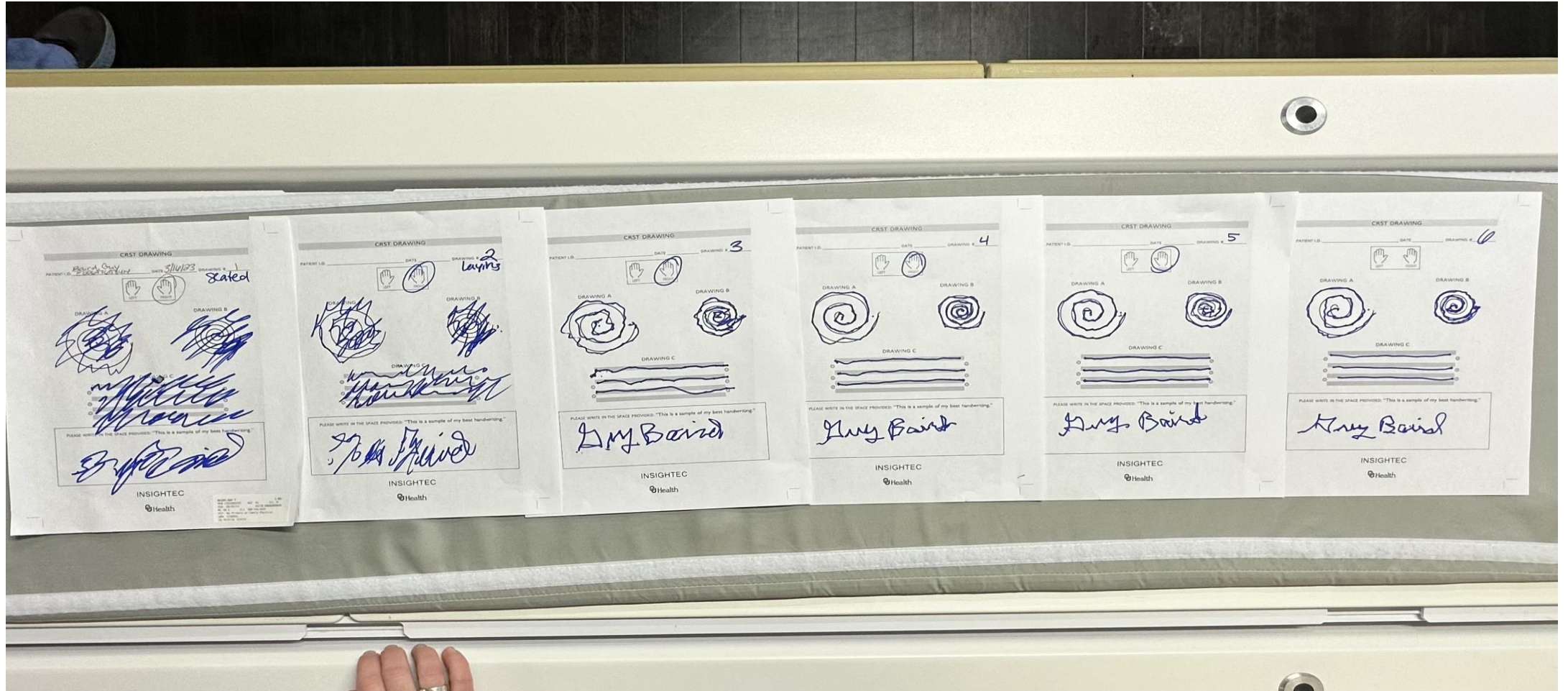
# Essential Tremor

## OU Health experience



# Essential Tremor

## OU Health experience





# How to Make An Appointment

**Clinic Name**

OU Health Physicians —  
Neurosurgery Clinic

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**Clinic Address**

1000 N Lincoln Blvd., Ste. 4000  
Oklahoma City, OK 73104

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**Clinic Phone Number**

(405) 271-4912

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**Toll-free Number**

(800) 574-1974

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**Website**

[OUHealth.com/essentialtremor](https://OUHealth.com/essentialtremor)

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**Email**

[essentialtremorsHiFU@ouhealth.com](mailto:essentialtremorsHiFU@ouhealth.com)