Advanced Treatment: Deep Brain Stimulation & Focused Ultrasound

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Disclosures

None

When should it be discussed?

Advanced Treatments should be discussed since **the first visit**!

- Keeps patients informed about their options.
- Emphasizes shared decision-making.
- Allows for future planning

What parts of the brain are targeted?

Subthalamic Nucleus (STN)

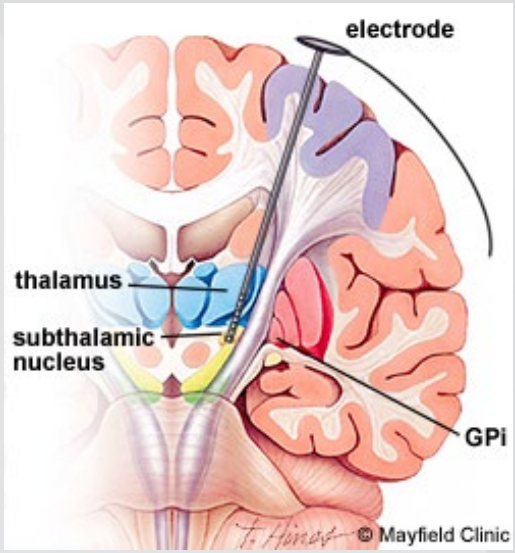
- Decreases levodopa dose
- Improves motor fluctuations

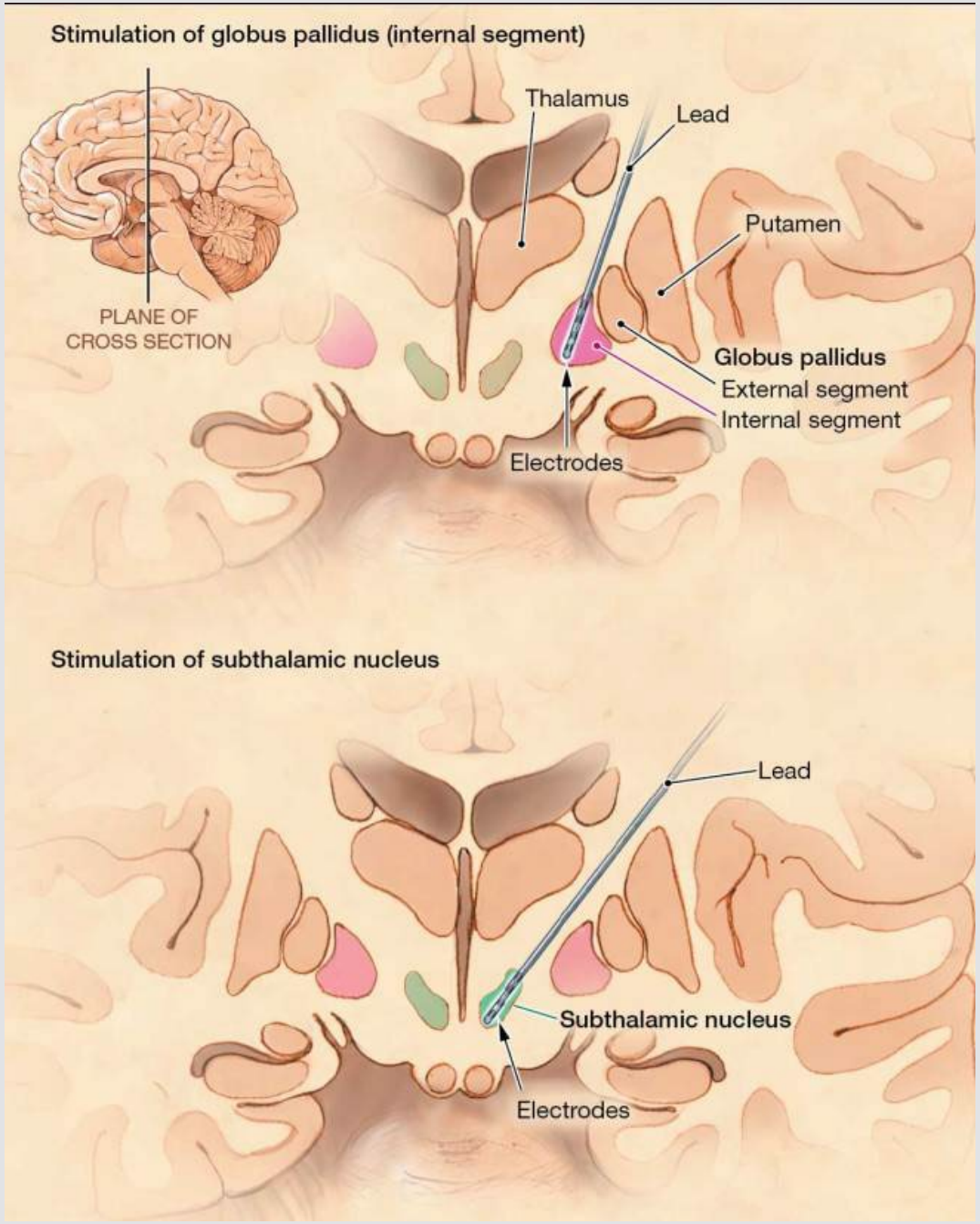
Globus Pallidus Pars Interna (GPi)

- Improves dystonia symptoms
- Improves motor fluctuations
- Less programming sessions

Ventral Inferomedial Thalamus (ViM)

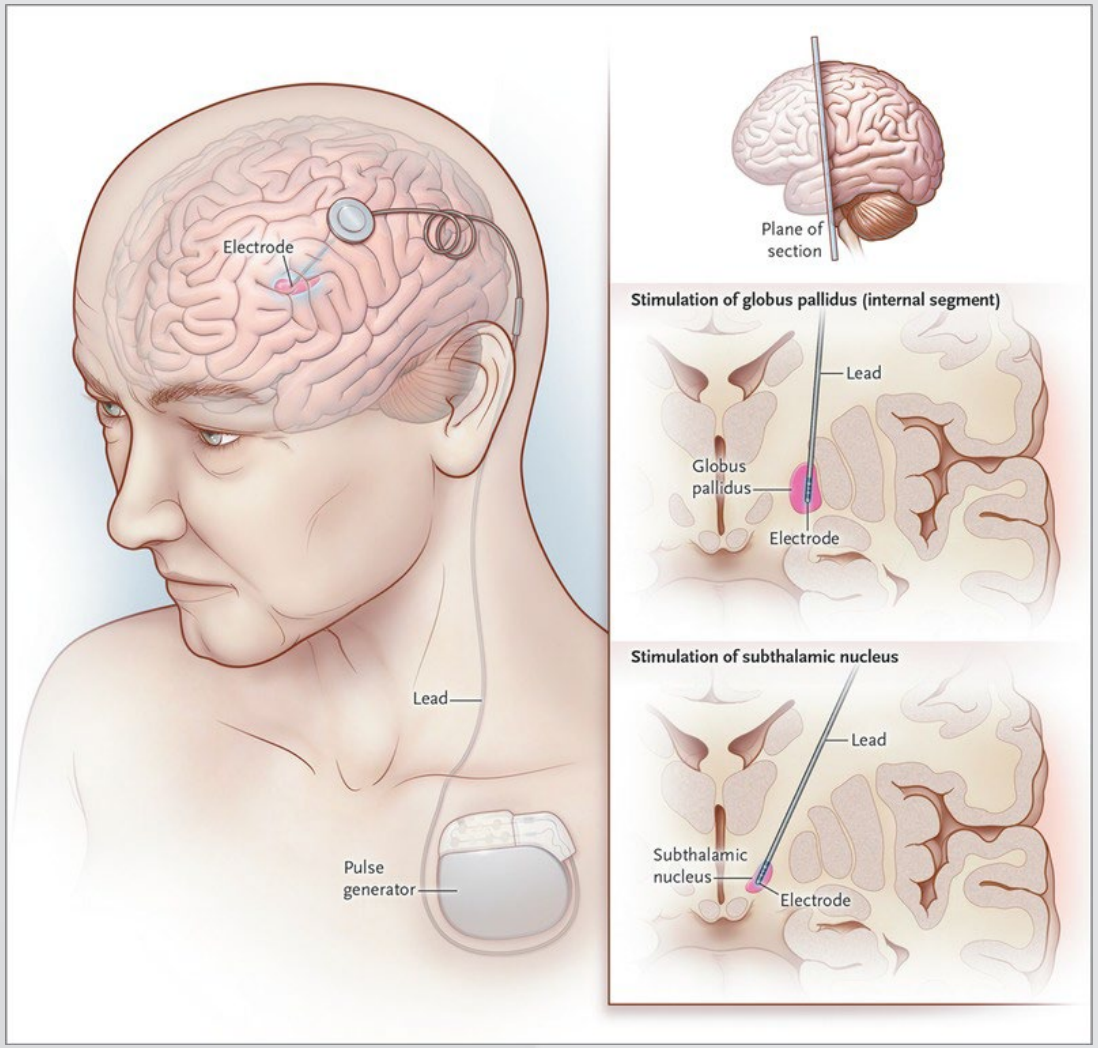
- Improves tremor
- Less chance of worsening psychiatric diseases




Stimulation of globus pallidus (internal segment)
PLANE OF CROSS SECTION
Thalamus
Lead
Putamen
Globus pallidus
External segment
Internal segment
Electrodes
Stimulation of subthalamic nucleus
Lead
Subthalamic nucleus
Electrodes

Deep Brain Stimulation (DBS)

What is it?



Surgical procedure whereby electrodes are implanted in specific brain targets to provide symptomatic benefit.

It is not a cure

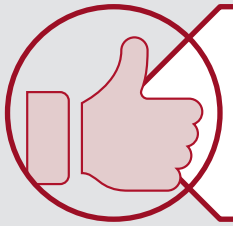
How do we evaluate candidacy?

1. Discuss interest with patient.
2. Schedule inpatient ON/OFF testing
3. Schedule a Brain MRI with specific sequences
4. Perform a neuropsychological evaluation
5. Discuss patient's results of steps 2, 3, 4 in a multidisciplinary conference with neurosurgery and neuropsychology.

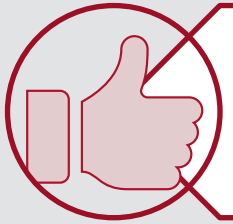
What is inpatient ON/OFF testing?

1. Stop Parkinson's medications (levodopa, dopamine agonists, etc.) the night before.
2. Stay in the hospital overnight.
3. Evaluation of motor symptoms in the morning while OFF.
4. 1.5x-2x the usual dose of levodopa is given.
5. Evaluation of motor symptoms when ON.

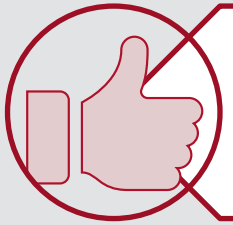
How to know if it's right for you?



Excellent response to PD medications



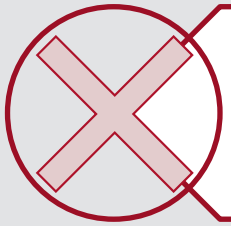
Intolerable PD medication side effects (nausea, vomiting, dyskinesias)



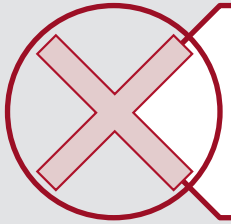
High dose burden (too many pills!)

Unbearable motor fluctuations (medication runs out too fast)

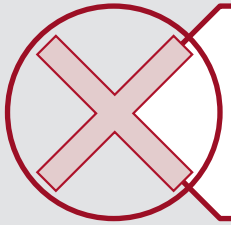
How to know if it's not for you?



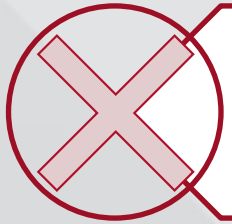
Decompensated psychiatric conditions



Surgical high risk (evaluated by surgeon or anesthesia)



Structural brain lesions where intended targets are (tumors, strokes, malformations)



Severe dementia

After surgery, what's next?

- Initial programming session – may take several hours.
- Subsequent sessions to fine tune appropriate response.
- Will medications be stopped?
  - Realistically*, medications will always be needed, though burden may decrease.

* **EACH PATIENT IS DIFFERENT**

Focused Ultrasound (FUS)

What is it?

Non-surgical technique

MRI guided high-frequency waves create a lesion in a specific target of the brain to provide symptomatic benefit.

It is not a cure

THIS IS STILL BEING RESEARCHED FOR PARKINSON'S DISEASE

UNMC CURRENTLY DOES NOT PERFORM THIS PROCEDURE.

YOU WOULD BE REFERRED TO ANOTHER FACILITY

How to know if it's right for you?

Same indications as DBS but do not want to/cannot pursue invasive surgery

Excellent response to PD medications

Intolerable PD medication side effects (nausea, vomiting, dyskinesias)

High dose burden (too many pills!)

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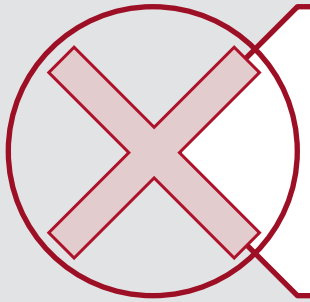
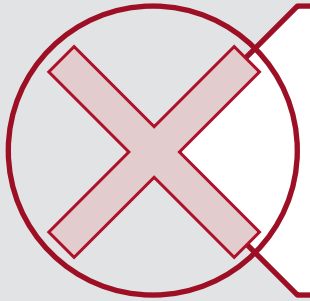
How to know if it's not for you?



Procedural high risk (evaluated by surgeon or anesthesia)



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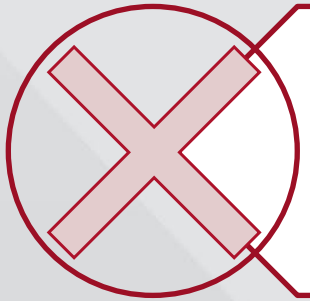

Unable to have an MRI

Comparing procedures

Deep Brain Stimulation	Focused Ultrasound
Invasive procedure	Non-invasive procedure
Hardware implanted	No hardware implanted
Overnight stay	Can leave in the same day
Reversible process	Irreversible Process
Can be adjusted over time	Cannot be readjusted
Longer-term benefits	Unilateral procedure for most cases*
	Undetermined long-term benefits

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