DEEP BRAIN STIMULATION

From why to what now?

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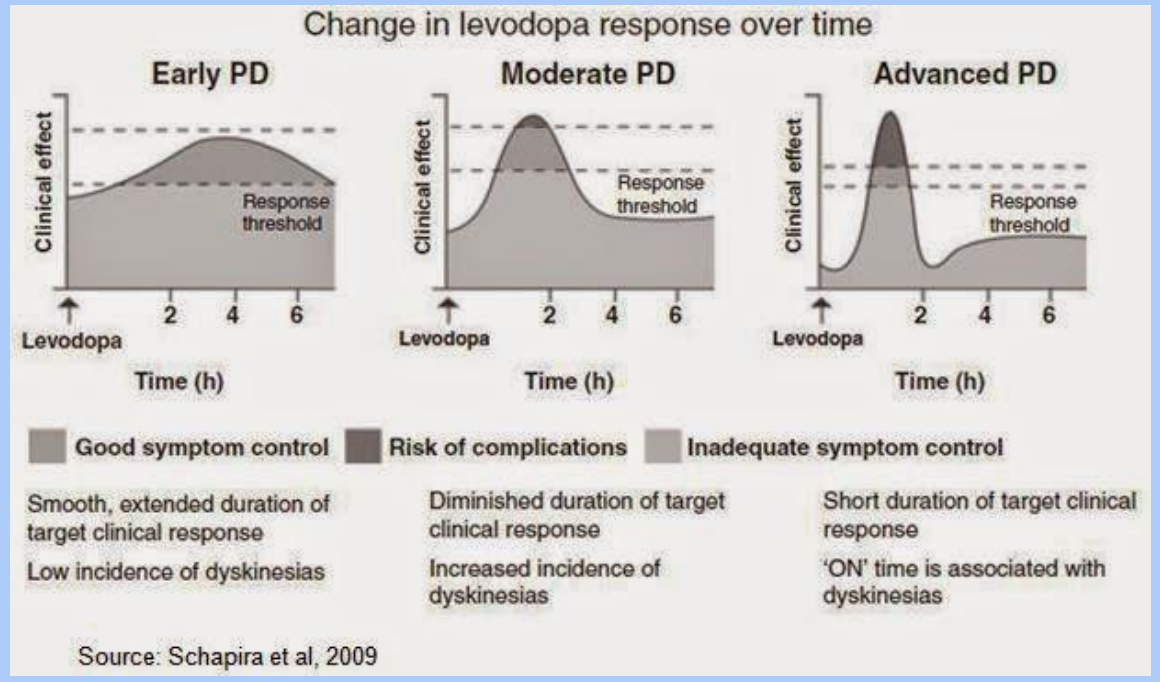
INOVA®

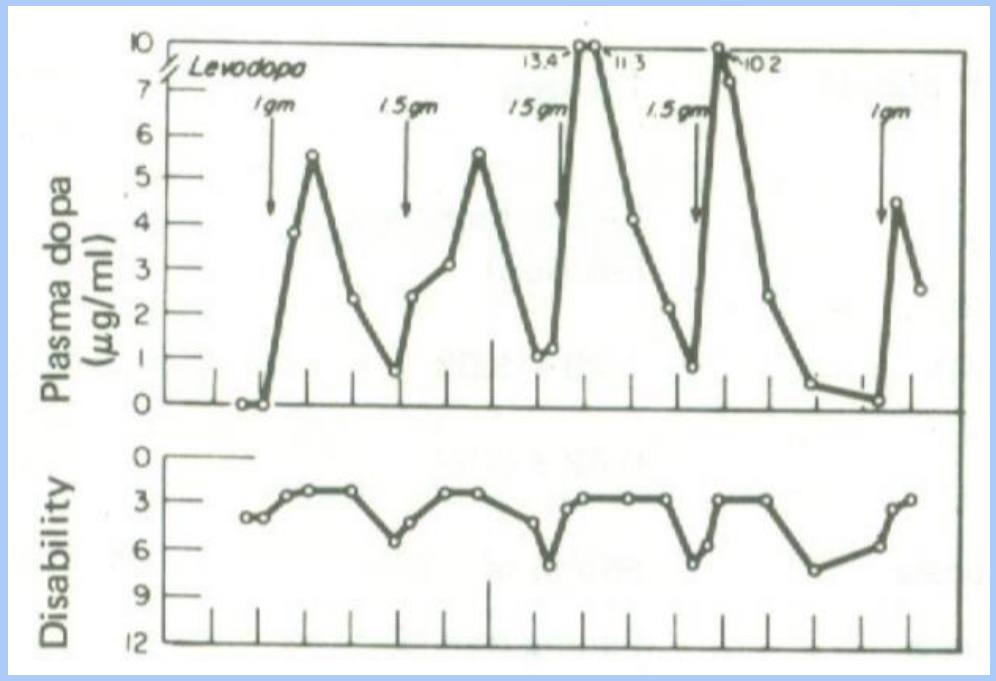
Movement Disorders Program

FIRST, TO REITERATE… WHY DBS?

Why does PD Advance?

The disease itself AND medications used





PULSATILITY DRIVES PROGRESSION

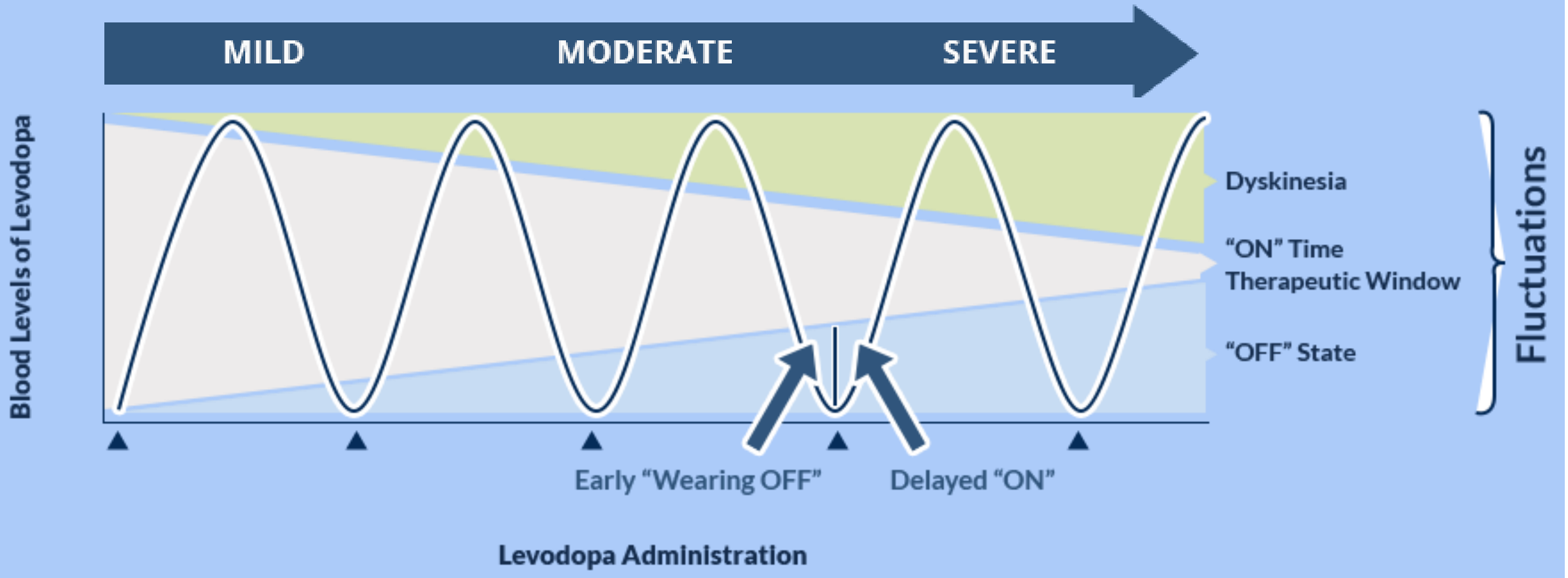
Classic Levodopa Formulation

- ELLDOPA trial 16.5% of patients randomized to **600 mg** of LD daily developed dyskinesias after only 9 months of treatment versus 2.3% among those on 300 mg (2004)
- Worsening motor complications with doses ≥ **600mg** per day at 6 months and 6 years (2005)
- Increased motor fluctuations and dyskinesia ≥ **500mg** per day at 6 years (2013)

Combination of disease progression and pulsatile medication dosing impacts the number of dopamine receptors present among other things.

Result = Worsening on-off fluctuations throughout the day

CARBIDOPA – LEVODOPA

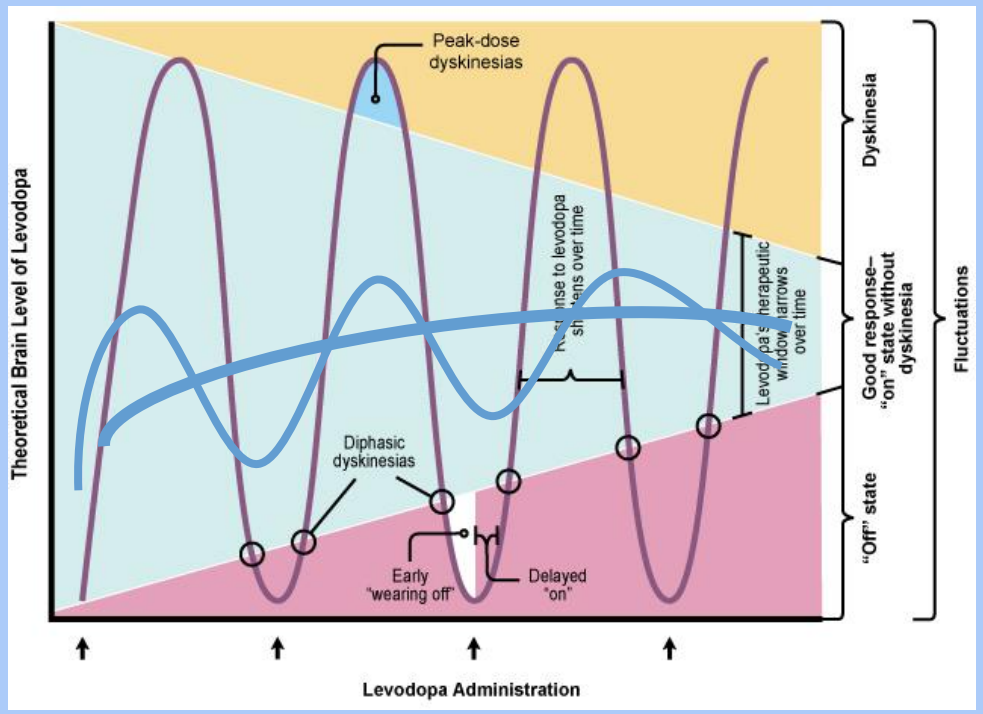


DBS TURNS BACK THE CLOCK

Parkinson's Disease:

- **80-90%** of patients note improvement
- **60%** reduction in medications
- **60%** reduction in dyskinesias
- **80%** improvement in "off" periods
- **10%** improvement in "on" periods

- Reduction in medications leads to decrease in the following:
  - Cost
  - Side effects (nausea, orthostasis, cognitive change, and downstream dyskinesia risk)



Krack et al. Five-year follow-up of bilateral stimulation of the subthalamic nucleus in advanced Parkinson's disease. N Engl J Med. 2003 Nov 13; 349(20):1925-34.

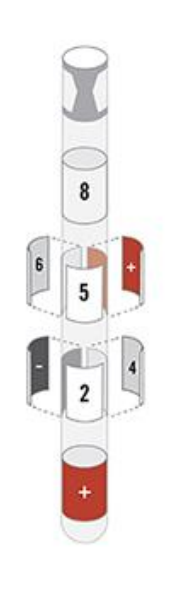
WHO IS A CANDIDATE

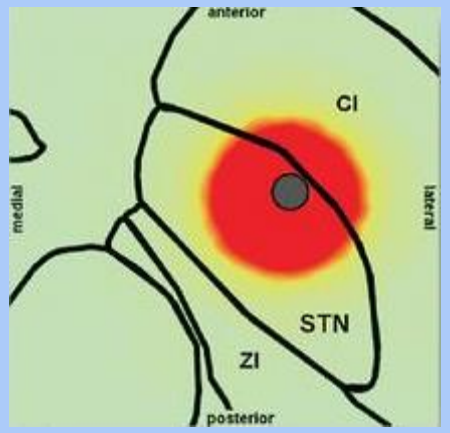
- A good candidate for DBS per our center:

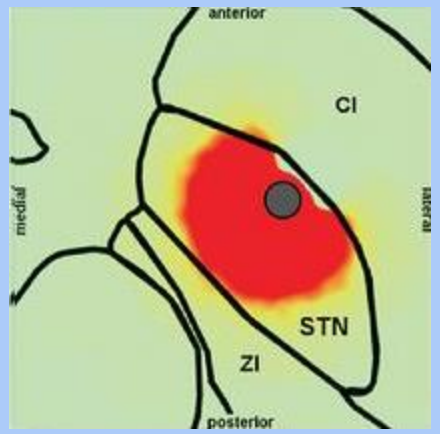
1. PD symptoms at least 4 yrs (FDA indication)
2. Experiencing a response to medication
3. Experiencing the on-off fluctuation of medication
4. Able to participate in care
5. Good surgical candidate
6. No diagnosed dementia or severe psychiatric disorder

AN EXPANDING FIELD

- Directional stimulation
- Improved technology
- Smaller technology, thinner
- Longer battery life







Medtronic

ST. JUDE MEDICAL™

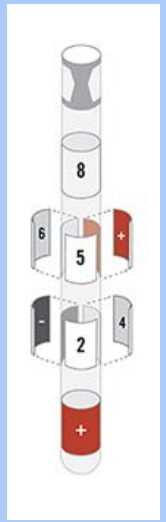
OPTIONS = GOOD FOR PATIENTS

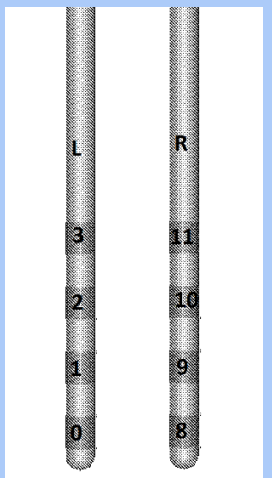
- MEDTRONIC SYSTEM
  - Has been around for 20 years.
  - Created the technology and built the industry.
  - Still a great system where people get better, and widely used.
  - MRI approved.
  - Non-Directional.
  - Voltage based.
  - Older technology.

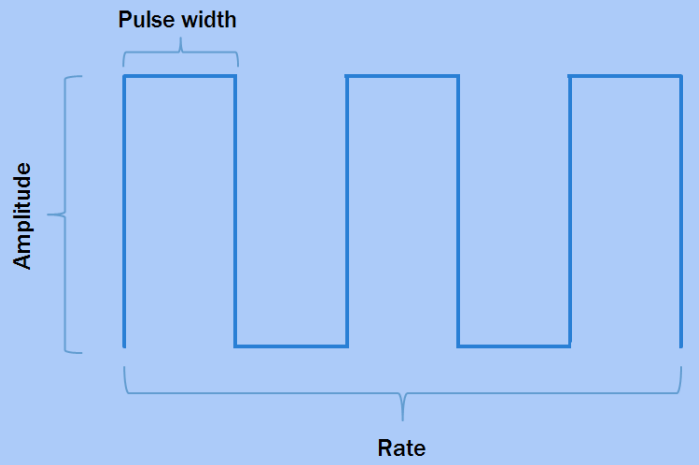
- ABBOTT/ST. JUDE SYSTEM
  - New player on the block.
  - Integrated the last 20 years of research.
    - Directional stimulation.
    - Current based.
  - Truly wireless and built on Apple platform – user designed.
  - Updateable.
  - Improved hardware, lower profile.
  - No MRI approval yet.

LEADS AND PROGRAMMING

- Two types of leads
  - 4 ring contact points on each lead
    - Stimulate around the lead.
  - 8 contact points per lead.
    - Stimulate around the lead and steer energy directionally.
- Adjust Electrical Delivery
  - Amplitude
  - Rate
  - Pulse Width







VISUALIZATION

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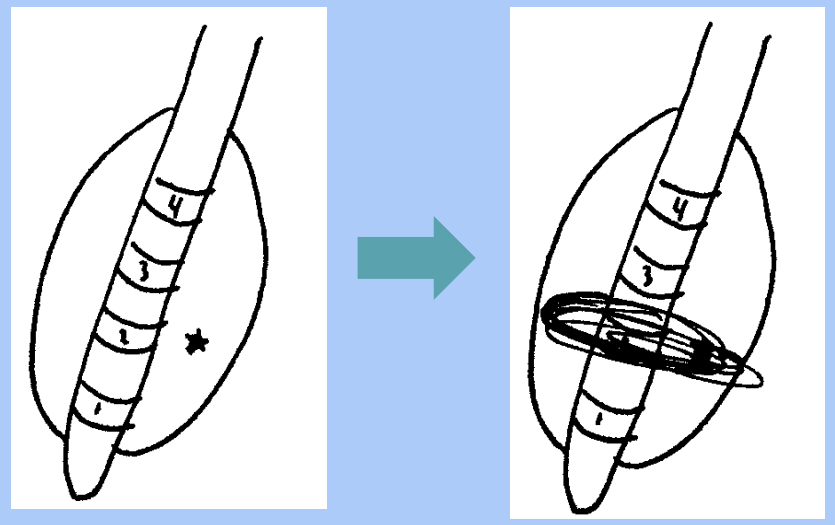
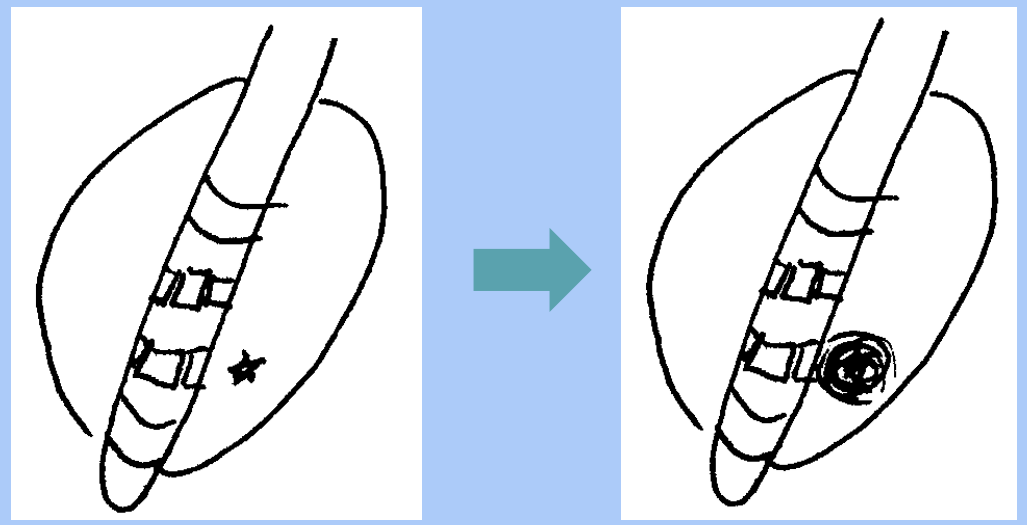
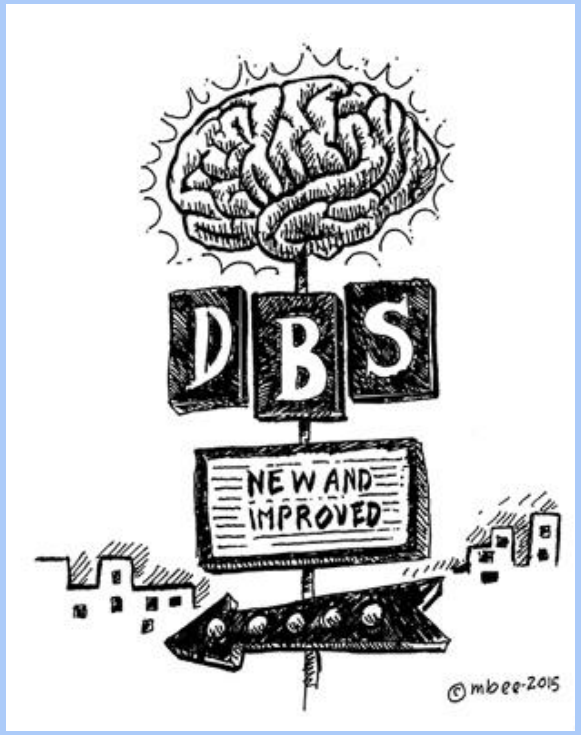




INITIAL PROGRAMMING GUIDELINES

- Guidelines for our center:
  - Initial programming is <u>1 month</u> after lead insertion
    - One lead – 1 hour appointment
    - Two leads – 1 hour appointment on 2 separate days
  - No medication since the night before
  - Bring their medication, a snack and family.
  - Initial follow up after first visit is 1 week later.
  - Able to fit in within a day for urgent changes; communicate via MyChart with response that day.



INITIAL PROGRAMMING VISIT - MAPPING

- Need to map out where the energy is going
- Start at the bottom contact and work our way up
  - Slowly increase power until we see benefit, and then onward until side-effect
  - Temporary
  - 0.25mA step size until general range, then fine tune to 0.1mA steps.
- Document mapping directly into EPIC chart.
- No personal programmer education up front.

RIGHT

C+ _____ 60/130

9
0.5 improved tremor
2 paresthesias in hand, transient
2.5 sustained paresthesia, voice

10A
1 improved tremor, improved RAM
1.75 transient paresthesia
2.25 transient paresthesia, facial pulling

10B
0.75 reduction in tremor
1.25 absent leg and finger tremor'
1.5 "feels good"
2.5 paresthesias, face

10C
1 improved RAM, tremor
1.5 tremor resolved, transient paresthesia
2 sustained paresthesia

SPACING OUT OF FOLLOW-UP VISITS

- After mapping, begin balancing of stimulator with reduction in medication.
  - Need to go at everyone's own pace… everyone is different.
- Once starting to find balance, educate on patient controller.
- Then, enter usual follow-up period
  - Visits then follow-up plus adjustment to programming
- The control is **yours**
  - MD provides parameters
  - Allows for non-office adjustments… by you.
  - Battery check
  - On/off
  - Adjust power up or down
  - Change between montages

IN SUMMARY

- PULSATILITY DRIVES PROGRESSION
  - Goal therefore is smooth, predictable and consistent therapy.
- DEEP BRAIN STIMULATION TURNS BACK THE CLOCK
  - Reduction in medication by 60-70%.
  - Smooth, predictable therapy directly at the source.
- NOW WE HAVE OPTIONS
  - Directional vs non-directional, Wireless vs Wired, Voltage vs Currant, etc.
- FIRST VISIT TAKES TIME
- BUT THEN, YOU HAVE CONTROL AND WE HAVE ANOTHER TOOL TO RIGHT THE SHIP.

THANK YOU

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