

What is this thing called Parkinson's?

Drew Falconer, MD

Director, Movement Disorders Specialist

Inova Parkinson's and Movement Disorders Center (IPMDC)



Parkinson's and
Movement Disorders Center

What's on tap?

Laying the groundwork...

How should we think about
Parkinson's?

What is Parkinson's?



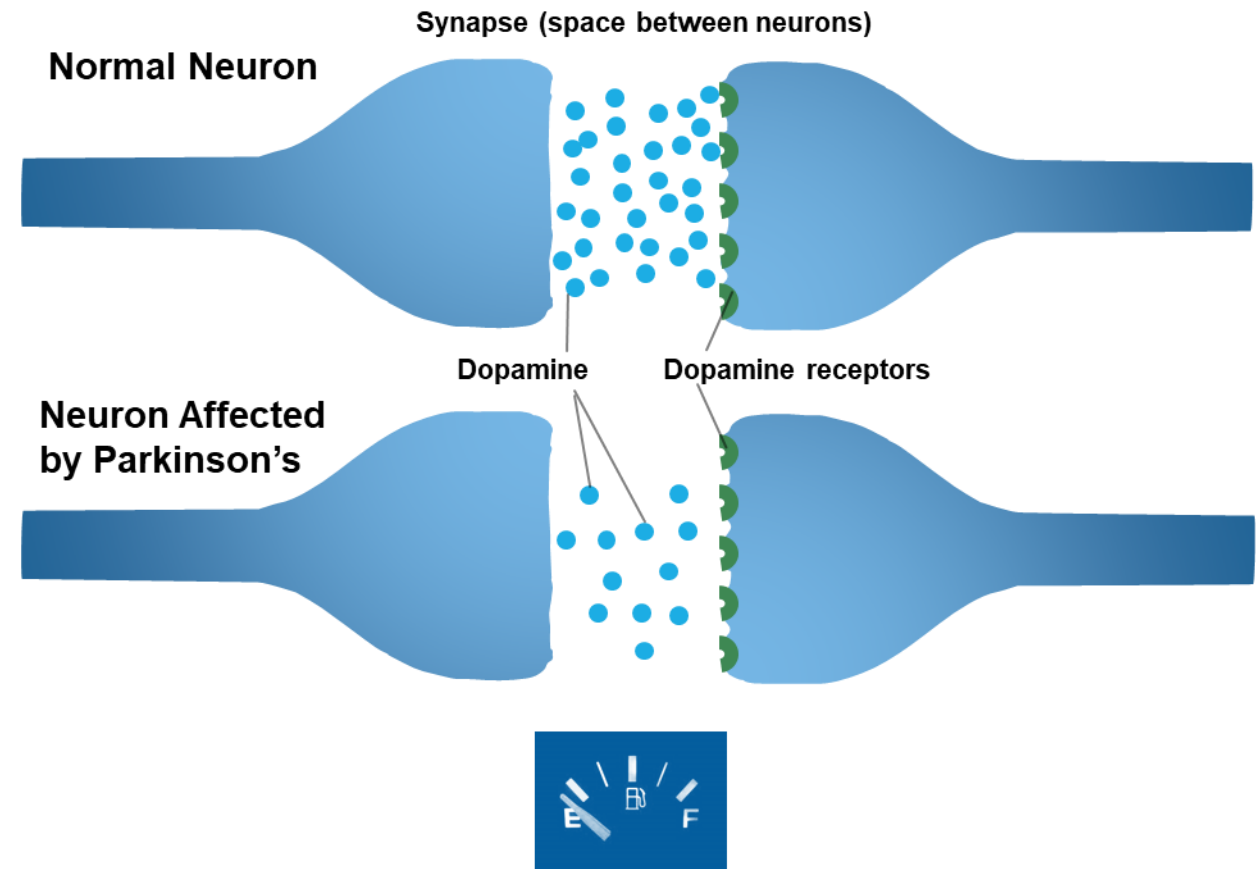
The Cause?

Genetics

- Classically NOT inherited

Environmental factors

- Pesticides including Agent Orange
- Well water
- Heavy metal exposure
- Chemical exposure
- Head injury (pugilistic Parkinson's)



How do we diagnose Parkinson's?

Symptoms/History/Exam

**When I walk down the hallway and back,
how does the doctor know I have Parkinson's?*

+ Response to Medications

Neurology Journal 2014:

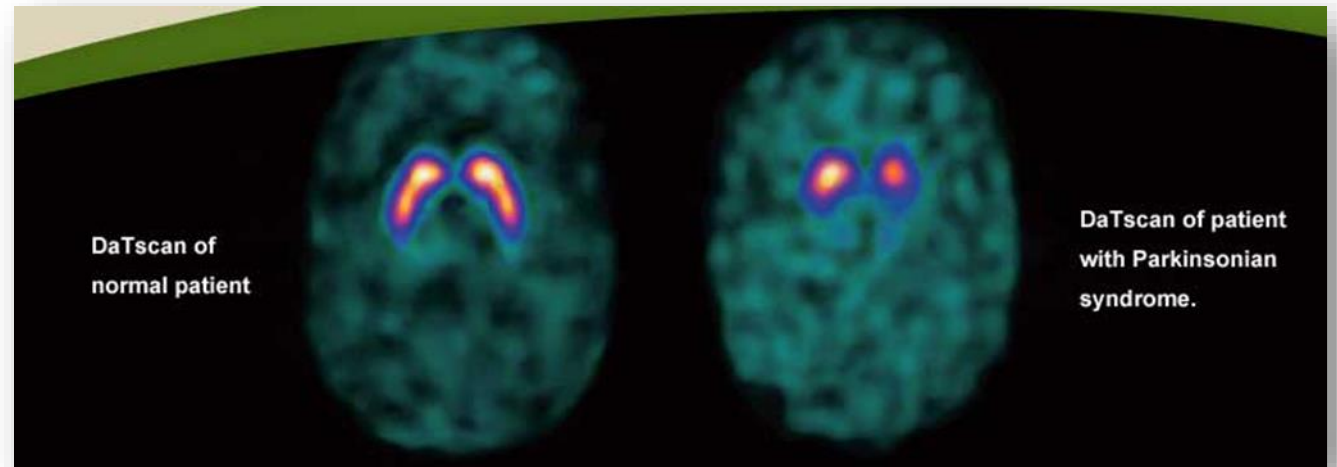
Accurate diagnosis even by a "Fellowship Trained Specialist": 85% accuracy

DaTscan

Dopamine Active Transporter

PET scan of brain highlighting dopamine transport system.

FDA approved since 2010,
covered by most insurers.



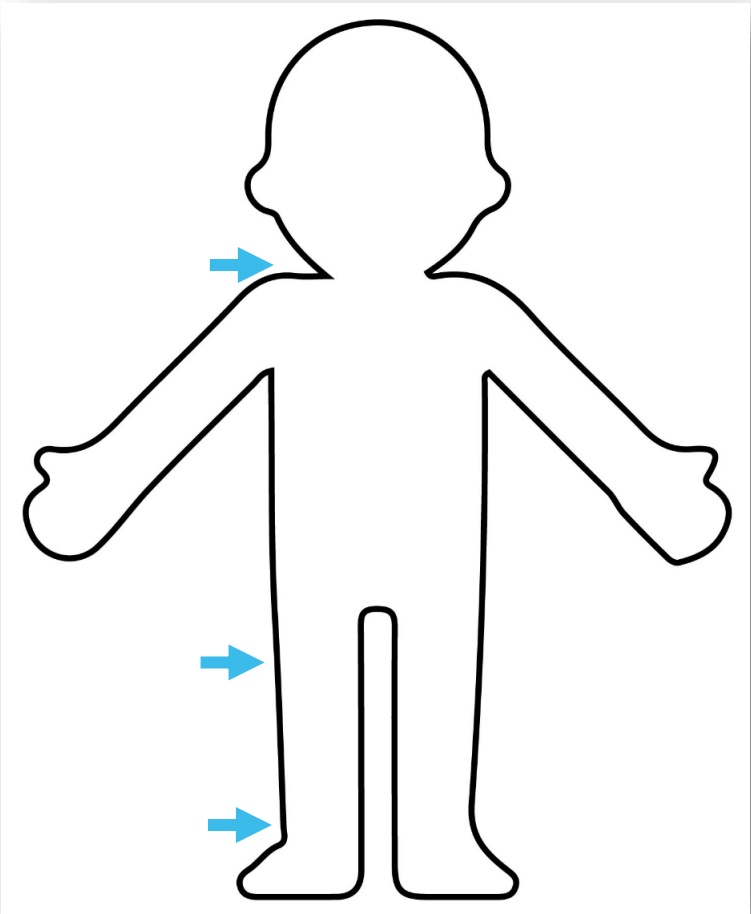
http://www.kernradiology.com/images/DaTscan_07.jpg

Syn-One Skin Biopsy

Checks for the deposit of phosphorylated alpha-synuclein in the skin

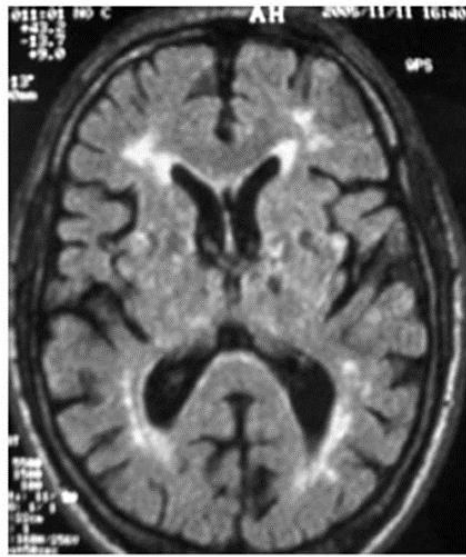
FDA approved to assist with a diagnosis of Parkinsonism.

POTENTIAL DIAGNOSIS	ASSESSMENT	STAIN
Synucleinopathy	Phosphorylated alpha-synuclein	P-SYN
Small fiber neuropathy	Reduced IENFD	Protein Gene Product 9.5 (PGP 9.5)
Amyloidosis	Amyloid deposition	Congo Red
Skin morphology	Dermatologic abnormality	Hematoxylin & Eosin (H&E)



Proper Diagnosis is Key to Proper Treatment

Parkinson-ism = “Like Parkinson’s”



We need to commit!

Parkinson-isms include the following:

- Vascular Parkinson’s
- Medication-induced Parkinson’s
- Parkinson’s Plus Syndromes
 - Multisystem Atrophy
 - Progressive Supranuclear Palsy
 - Corticobasal Degeneration
- Normal pressure hydrocephalus (NPH)

What happens if you have reduced dopamine?

Motor and Non-motor Symptoms

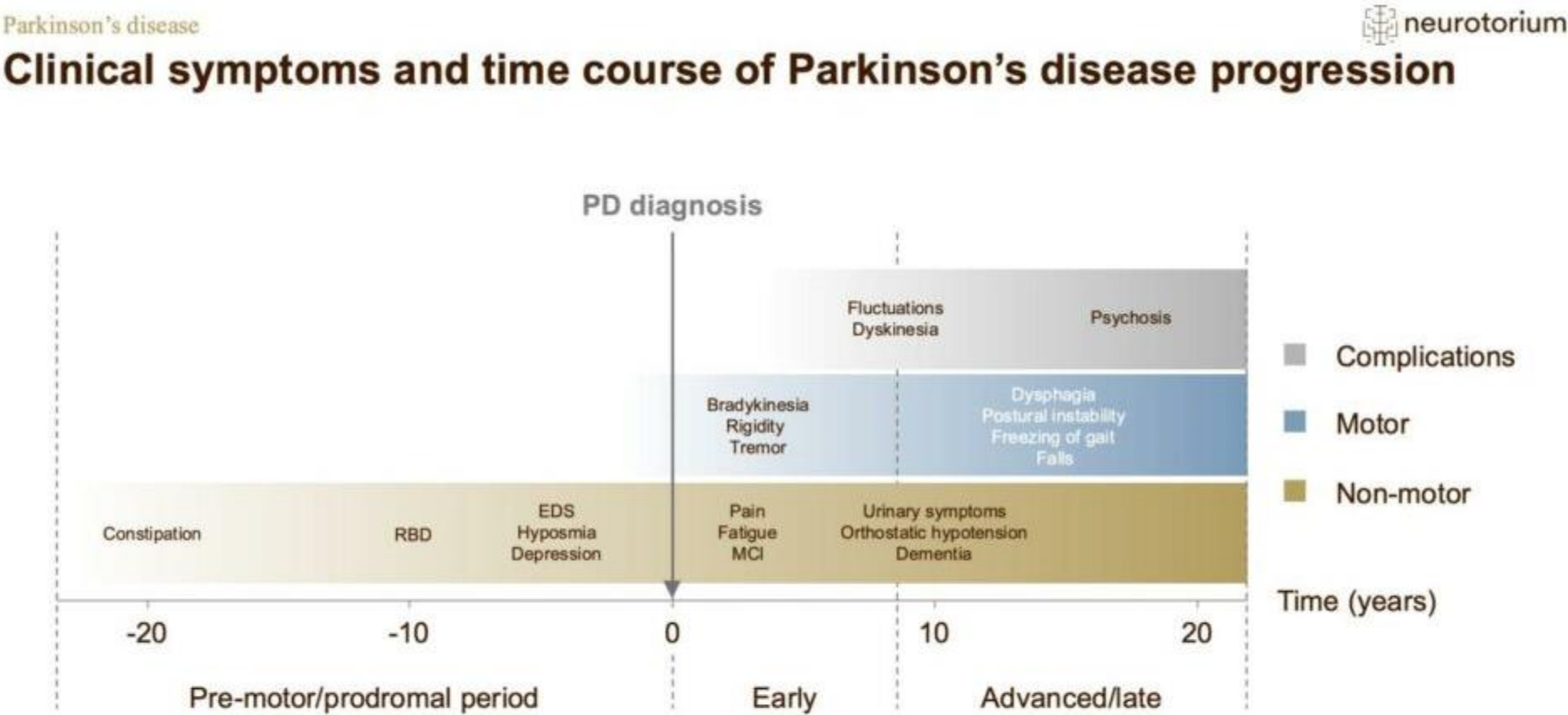
Systems which function inappropriately due to reduction in Dopamine or one of its byproducts

Motor Symptoms

- Resting tremor
- Tremor with position
- Bradykinesia (slowness)
- Rigidity (stiffness)
- Slow walking, shuffle, reduced arm swing
- Balance issues
- Reduced facial expression
- Speech changes (hypophonia)



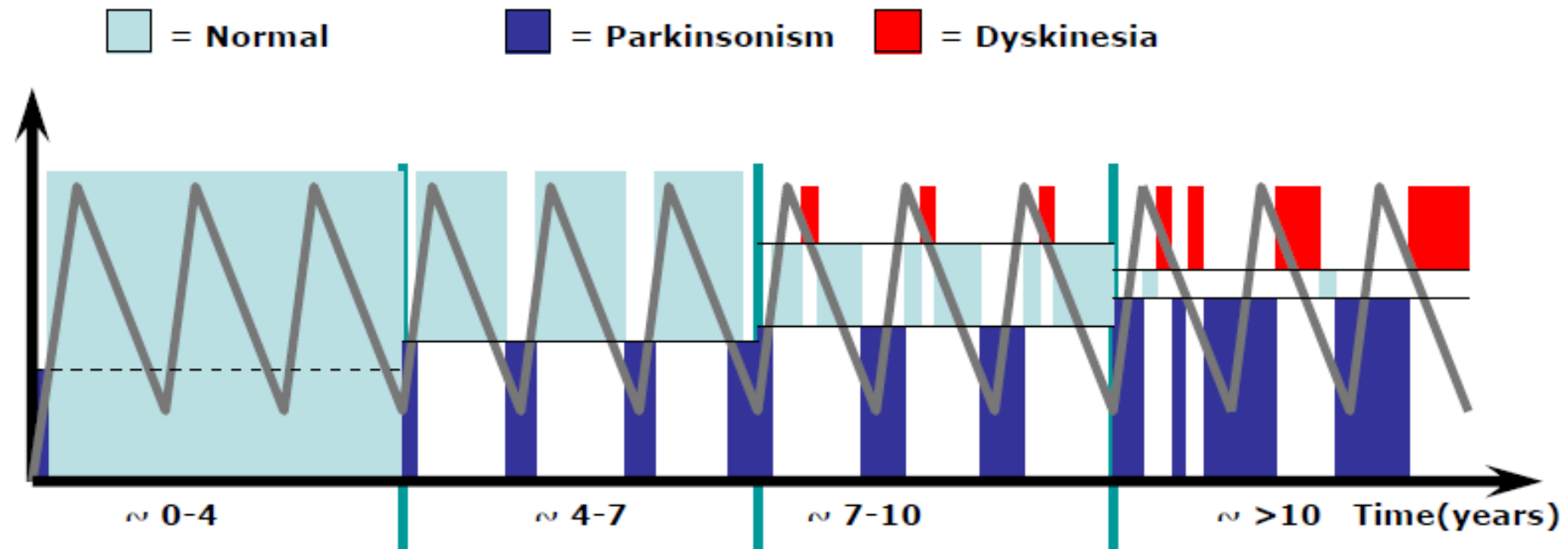
Parkinson's Changes Over Time



EDS=excessive daytime sleepiness; MCI=mild cognitive impairment;
RBD=REM (rapid eye movement) sleep behaviour disorder

Adapted from: Kalia & Lang. Lancet 2015;386(9996):896-912

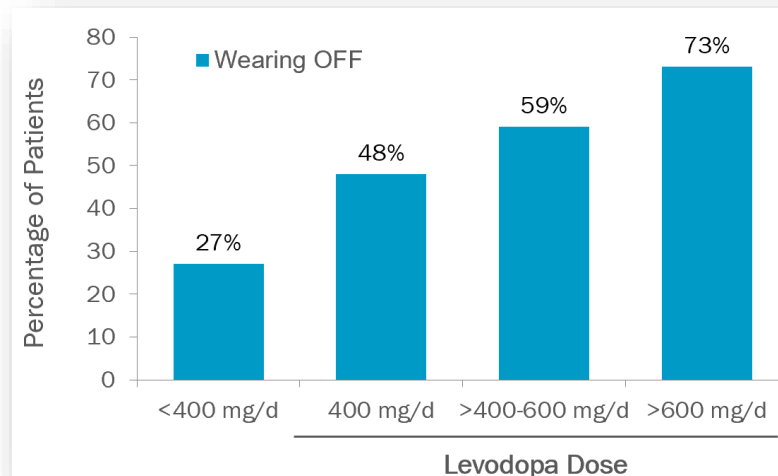
Why does PD change over time?



OFF Time – The Enemy

Medication problem?

- First AM off
- End of dose
- Sub-optimal on
- Sudden off
- Dose failure
- Exercise-induced
- Food-induced



Online survey of 3,000+

70% reported 2+ Off episodes a day.

65% reported 2 or more hours a day

50% – moderate/severe, affected daily activities

Motor and non-motor OFF

If we fix OFF, we fix Parkinson's Disease.

Not “One Size Fits All”

Everyone's journey is unique:

- Onset, medication response, timeline for progression.
- Treatment plan changes.

More than just Parkinson's disease at play:

- Age
- Other health conditions
- Degree of exercise
- Diet – healthy food vs not
- Sleep
- Hydration
- Etc.



How can people live well with Parkinson's?

Individualized treatment



Stay active and engaged



Remember, not the Parkinson's of old anymore



Sir William Richard Gowers, 1886

Old Parkinson's



Tom, IPMDC patient

Parkinson's in 2023!!

Next up



What's New? Medications



January 8, 2024

What's New? Medications



Parkinson's and
Movement Disorders Center
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Speakers

Drew Falconer, MD

Director,
Movement Disorders Specialist

Inova Parkinson's and Movement
Disorders Center (IPMDC)

Associate Professor of Neurology

UVA School of Medicine – Inova Campus

Sean Rogers, MD

Medical Director,
Memory Disorders

Movement Disorders Specialist

Inova Parkinson's and Movement
Disorders Center (IPMDC)

Disclosures

Drew Falconer, MD

D. Falconer has received consultancy or speaker fees from Abbott Laboratories, Abbvie, Amneal, Acorda, GE HealthCare, Kyowa Kirin, Neurocrine, Merz, Medtronic, and Supernus.

Dr. Falconer also receives compensation as an FTC and Justice Department subject matter expert.

Disclosures

Sean Rogers,
MD

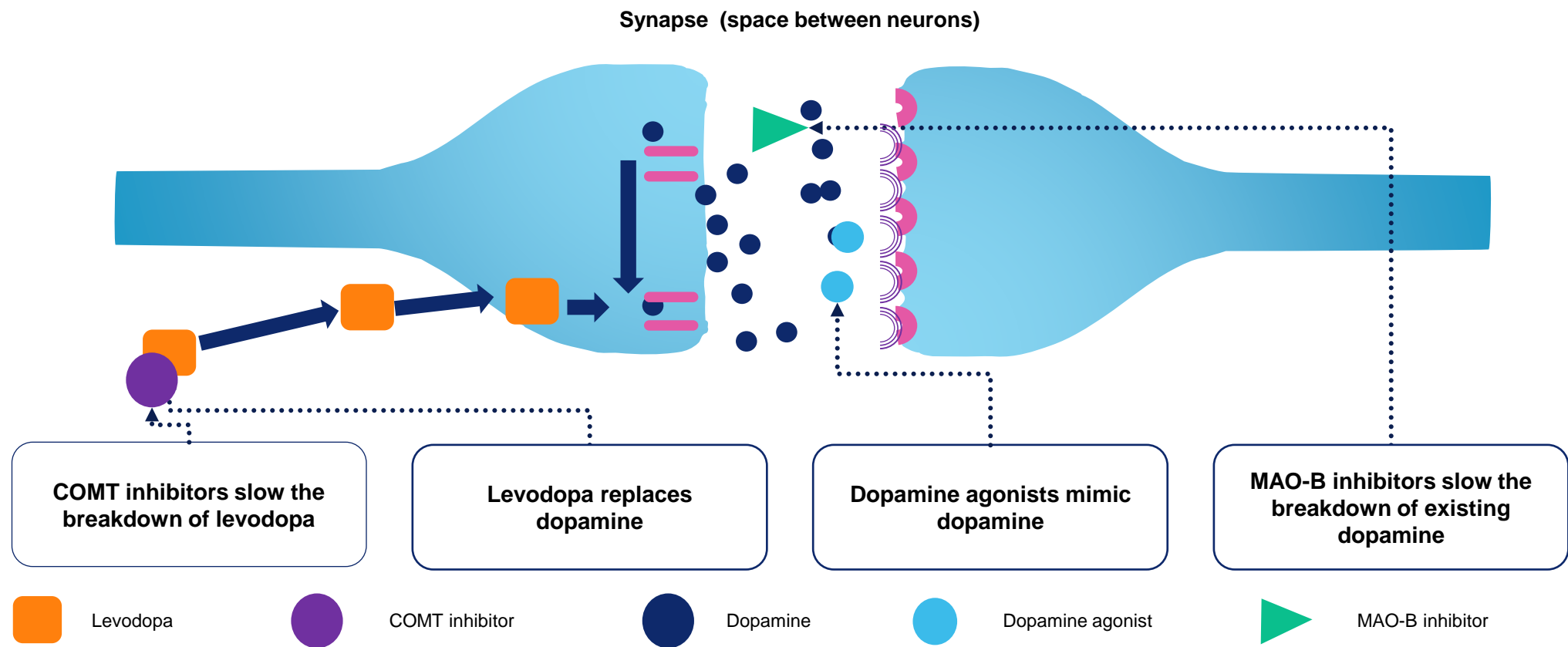
Nothing to disclose.

What's on tap?

- Medication categories
- Off/on time
- Timing
- New therapies
- Cost

Medication Categories for PD

Parkinson's disease medicines work to increase dopamine or act like dopamine in the brain



COMT = catechol-O-methyltransferase.
MAO-B = monoamine oxidase-B.

Kalia LV et al. *Lancet*. 2015;386:896–912

Timing of Medications

- Very little flexibility in scheduling.
- 4 hours means 4 hours apart.
- Look for lower limit of the window (i.e., No closer than 4 hours apart)
- Timing of protein and meals with meds
- Space tube feedings away from meds

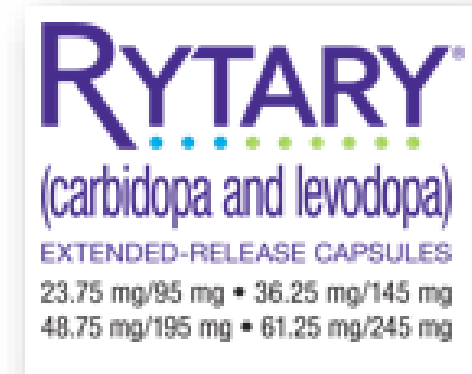




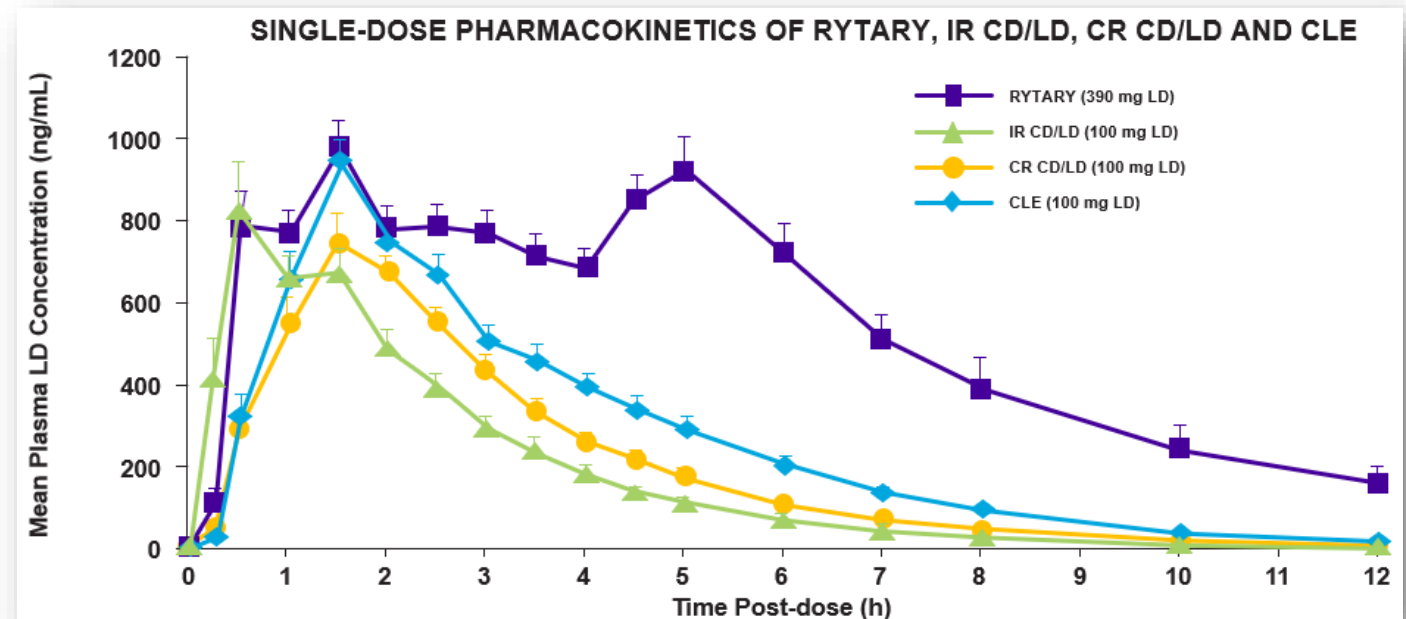
So what is new?

Longer Lasting Carbidopa/Levodopa Formulation

Rytary™ (carbidopa/levodopa) Amneal



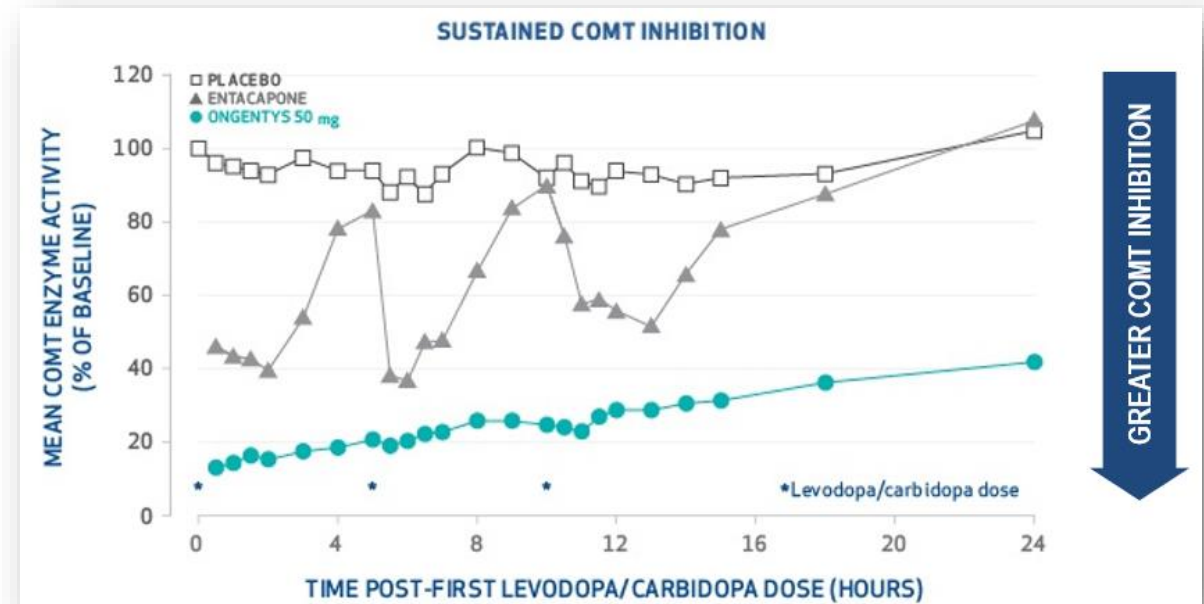
- History of evolution of levodopa delivery ----->
- Equivalent dose of Rytary on average 1.2 more hours of “on time” compared to IR.



Maximize Your Levodopa

Ongentys™ (opicapone) Amneal

- 1x daily inhibitor of COMT enzyme.
- Boosts levodopa for 24 hours
- Blocks breakdown of levodopa in the periphery, making more available to the brain
- In use in Europe since 2016
- Once daily at bedtime away from food



Non-Dopamine Approach

Nourianz™ (istradefylline) Kyowa Kirin

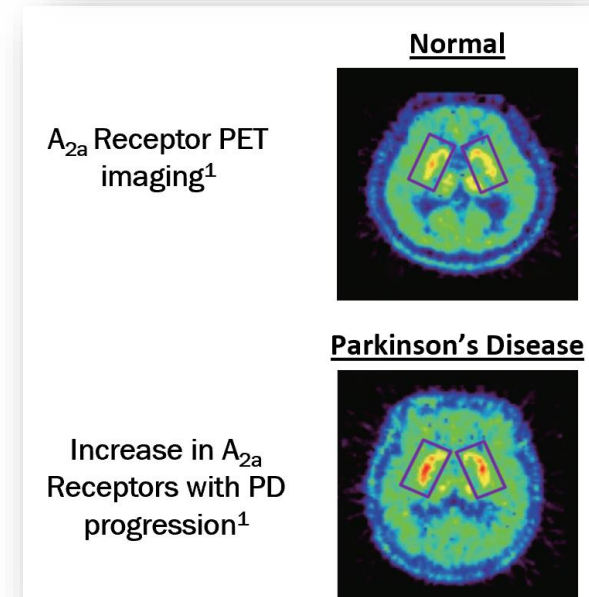
INDIRECT pathway – activation reduces motor activity

- Direct pathway increases activity (dopamine, etc.)
- Indirect pathway inhibits motor activity (adenosine, GABA)

Adenosine A_{2a} receptor antagonist

- Double negative, blocks the block

Improves off time, releasing the 'brake' on the system.

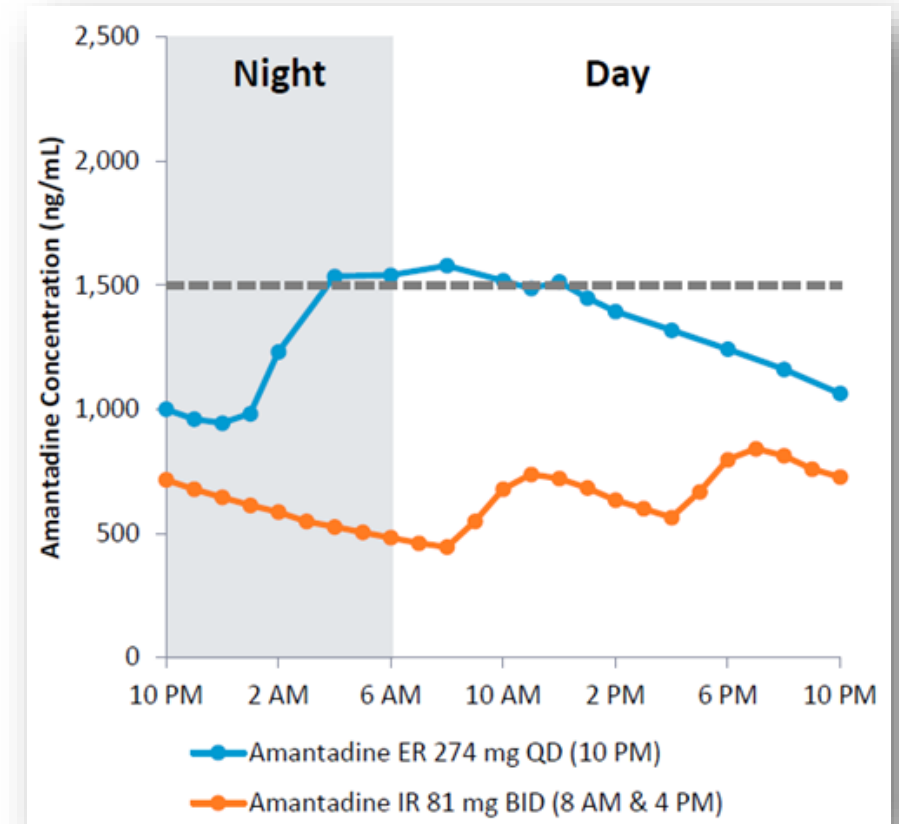


Dyskinesia and Off Time

Gocovri™ (amantadine ER) Supernus

- 1x daily amantadine ER at bedtime
- First “FDA approved” therapy for dyskinesia AND off periods
- Used to reduce dyskinesia (37% reduction or elimination)
- Reduced OFF time by 45% during the day

GOCOVRI®
(amantadine) extended release capsules



Rescue Option #1 - Apokyn

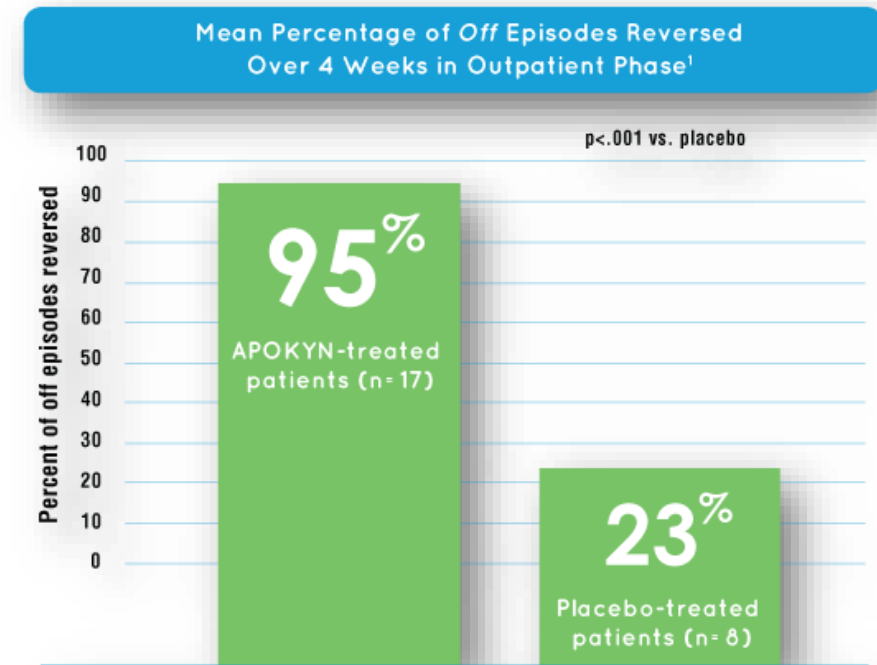
Apokyn™ (apomorphine injection) Supernus

Rapid onset Dopamine Agonist via injection

For different types of OFF episodes:

- Rapid off, wearing off
- Dose failure / unexpected off
- Delayed on
- First AM symptoms or exercise intolerance

Achieve ON within 10-20 minutes



Rescue Option #2 - Inbrija

Inbrija™ (levodopa inhalation powder) Acorda



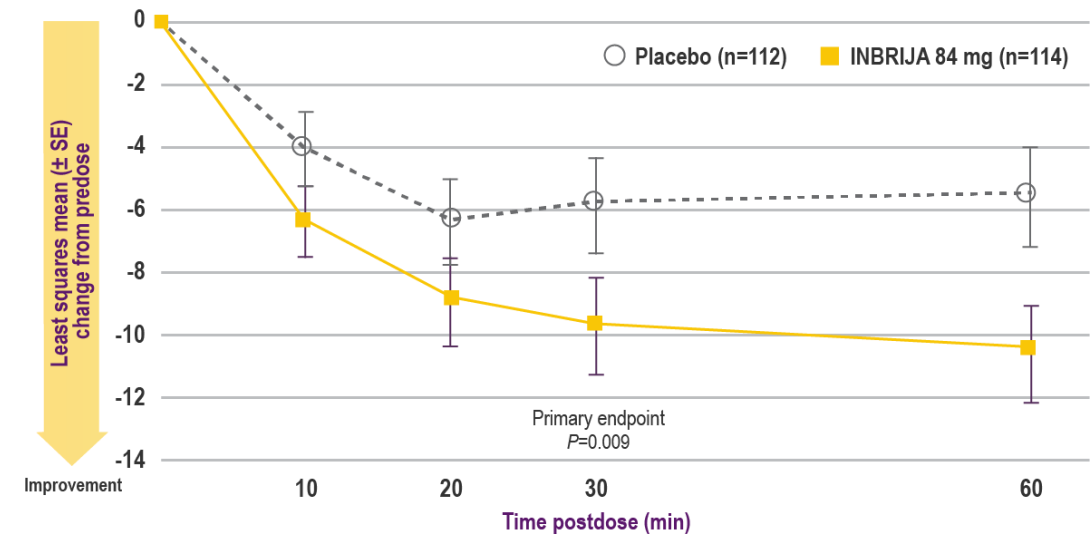
Rapid onset levodopa through inhaler

For different types of OFF episodes:

- Rapid off, wearing off
- Dose failure / unexpected off
- Delayed on
- First AM symptoms or exercise intolerance

Achieve ON within 10 minutes,
can take up to 5x daily

UPDRS Part III Score Change From 0-60 Minutes Postdose at Week 12



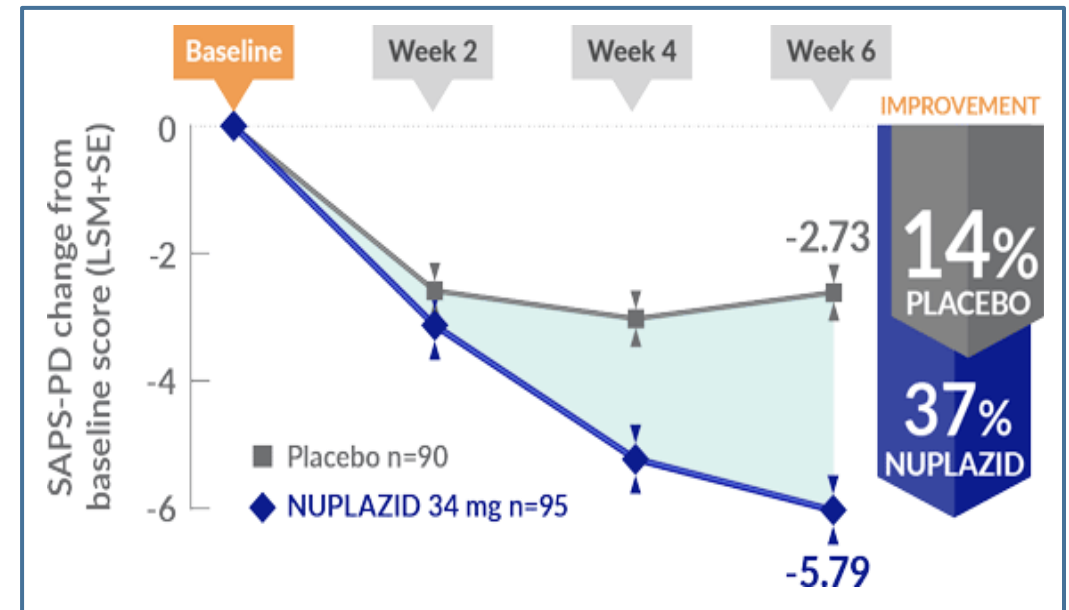
Hallucinations and Psychosis

Nuplazid (Pimavanserin)™

Acadia

- First antipsychotic medication specifically designed for hallucinations and 'psychosis' associated with Parkinson's Dementia and Lewy Body Dementia.
- Serotonin Agonist with no impact on dopamine receptors
- + SAPS-PD improvement with no change in UPDRS
- More effective when prescribed sooner, when hallucinations are beginning.

NUPLAZID™
(pimavanserin) tablets

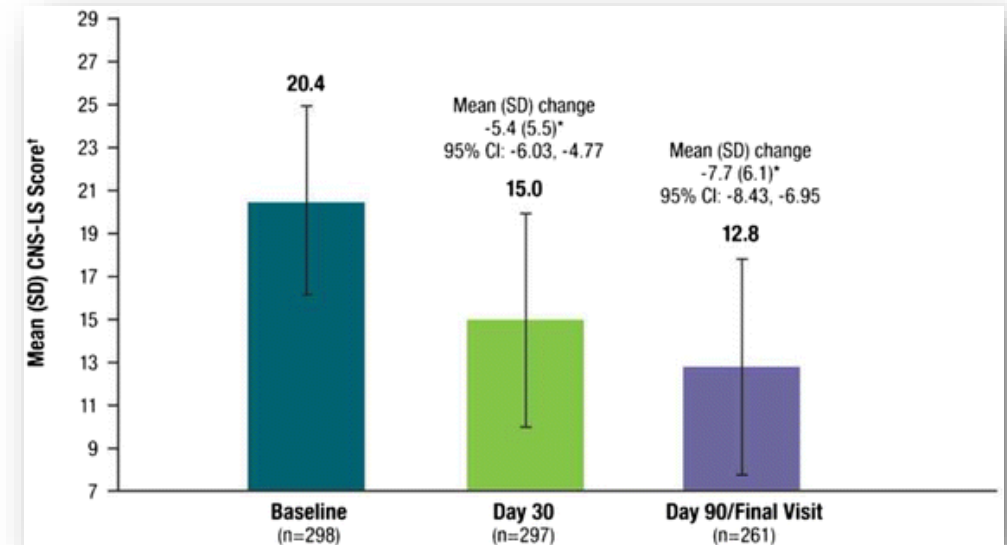


Pseudobulbar Affect

Nuedexta™

Otsuka

- “Uncontrollable episodes of crying and/or laughing, or other emotional displays.”
- Disconnect between emotion and display, or inappropriate display
- PRISM study – 26%, though up to 40% in PD
- CNS-LS Screening reflects symptoms
- **Reduction in episodes at 90 days was 72.3% if not fully resolved.**



Stay away from list

AVOID:

- haloperidol (Haldol) and most neuroleptics
- prochlorperazine (Compazine), metoclopramide (Reglan), promethazine (Phenergan) and droperidol (Inapsine)
- MAO-B inhibitors with Cipro, dextromethorphan, meperidine (Demerol) and tramadol (Rybix, Ryzolt, Ultram)

CONSIDERED SAFE:

- pimavanserin (Nuplazid), quetiapine (Seroquel) and clozapine (Clozaril)
- trimethobenzamide (Tigan) and ondansetron (Zofran)
- Ask the pharmacist.

Cost of Medications

- Doctors do not know \$\$.
- Out of pocket is different from cost: health insurance, deductibles, etc.
- Pharmaceutical companies offer patient support. Your doctor can help too.
- Consider changing your health insurance plan during open enrollment.
- Patient support programs at:
<https://ipmdc.org/patient-assistance/>

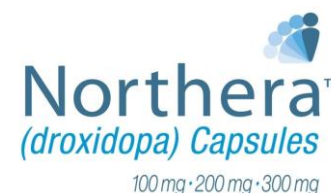




XADAGO
(safinamide) tablets



Parkinson's and
Movement Disorders Center



New toolbox and growing



Dopamine Agonist

Carbidopa/Levodopa formulation

MAOB inhibitor

COMT inhibitor

A2a agonists

Amantadine derivatives

Rescue Therapies

Symptom specific therapies

Next up



What's New? Targeted Technologies (DBS and more)



What's New? Targeted Technologies DBS and More

_____, MD

Movement Disorders Specialist

Inova Parkinson's and Movement Disorders Center (IPMDC)



Parkinson's and
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Disclosures

_____, MD

List

What's on tap?

When to think about more.

How do these technologies
work?

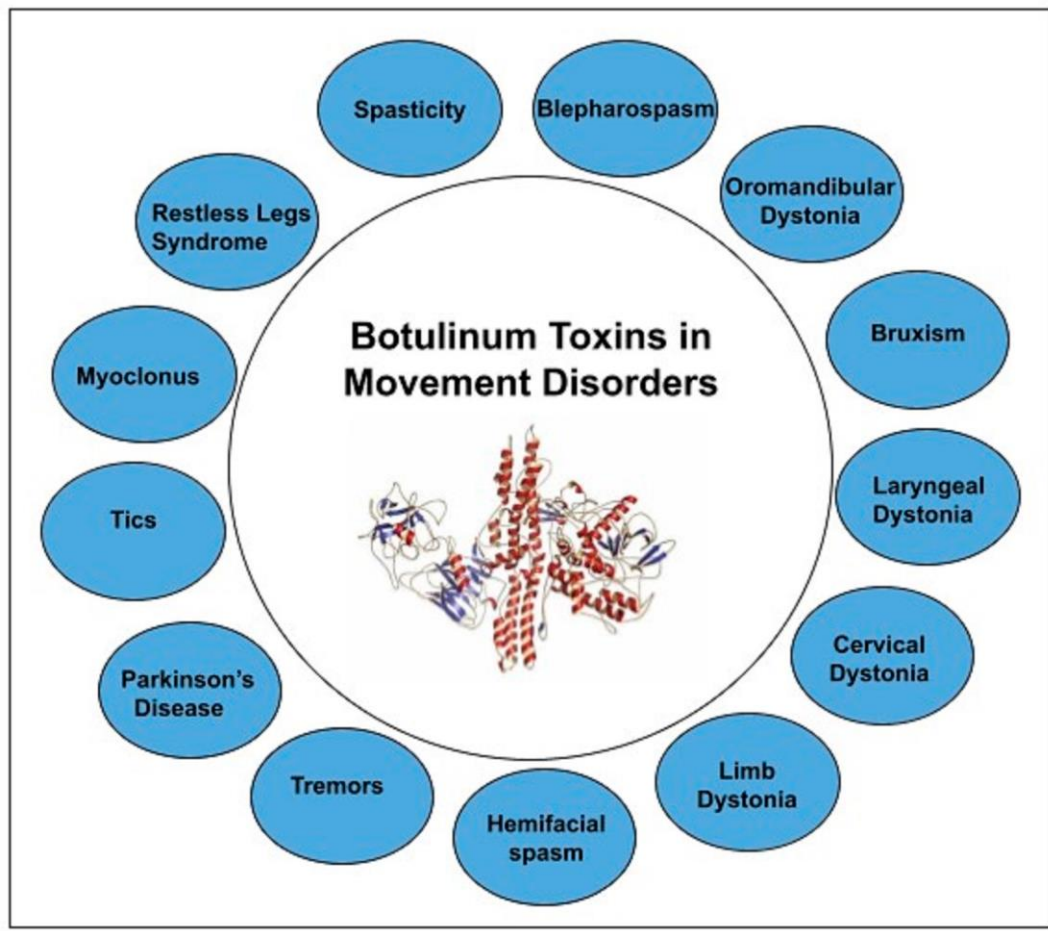
To the future!

Targeted Technology, NOT “Advanced Treatments”

- Botulinum toxin injections
- DUOPA Intestinal Gel Carbidopa/Levodopa
- Focused Ultrasound
- Deep Brain Stimulation



Botulinum Injections – Botox, Xeomin, Myobloc, Dysport



Sialorrhea too!

Botulinum Toxin for Chronic Drooling (Sialorrhea)

Botox - Abbvie



Xeomin - Merz

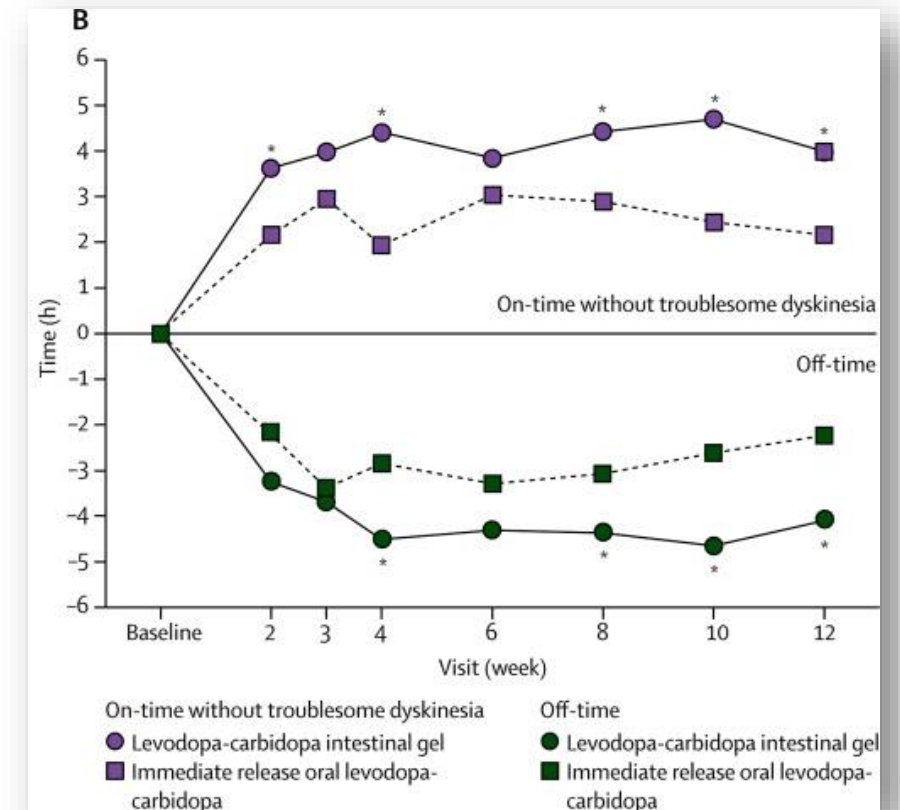


Constant Delivery of Levodopa

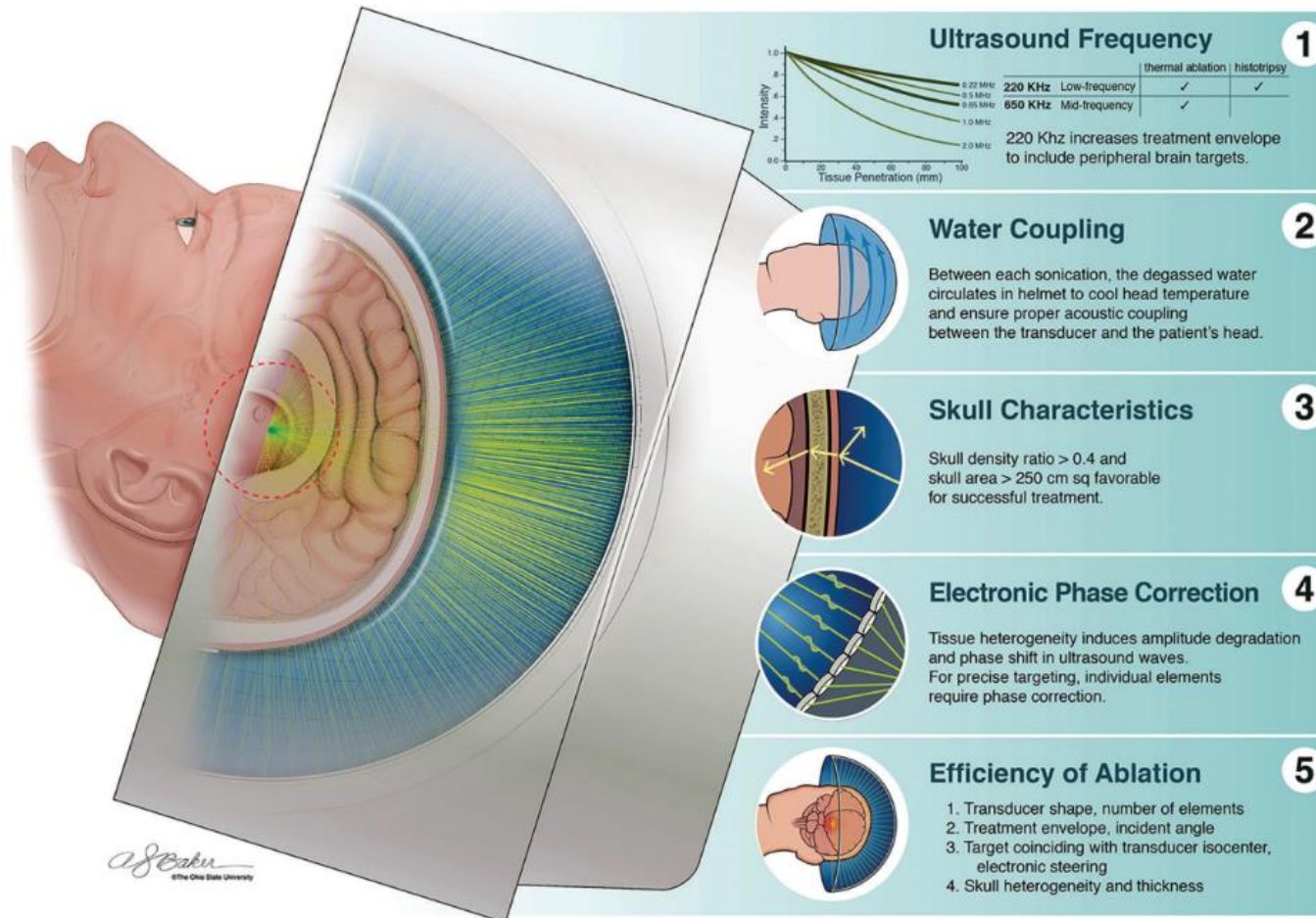
Duopa

Abbvie

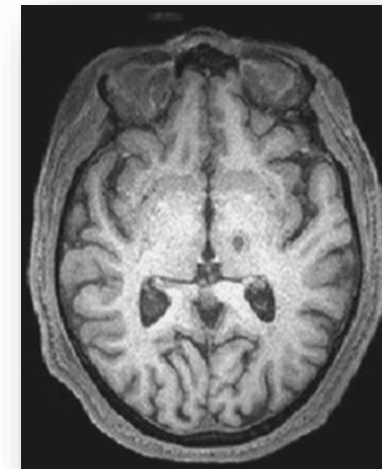
- Dopamine gel continuously administered via intra-intestinal pump
- Provides steady delivery of levodopa without the fluctuations of oral medication
- Off time decreased by 4h and on time increased by 4h¹



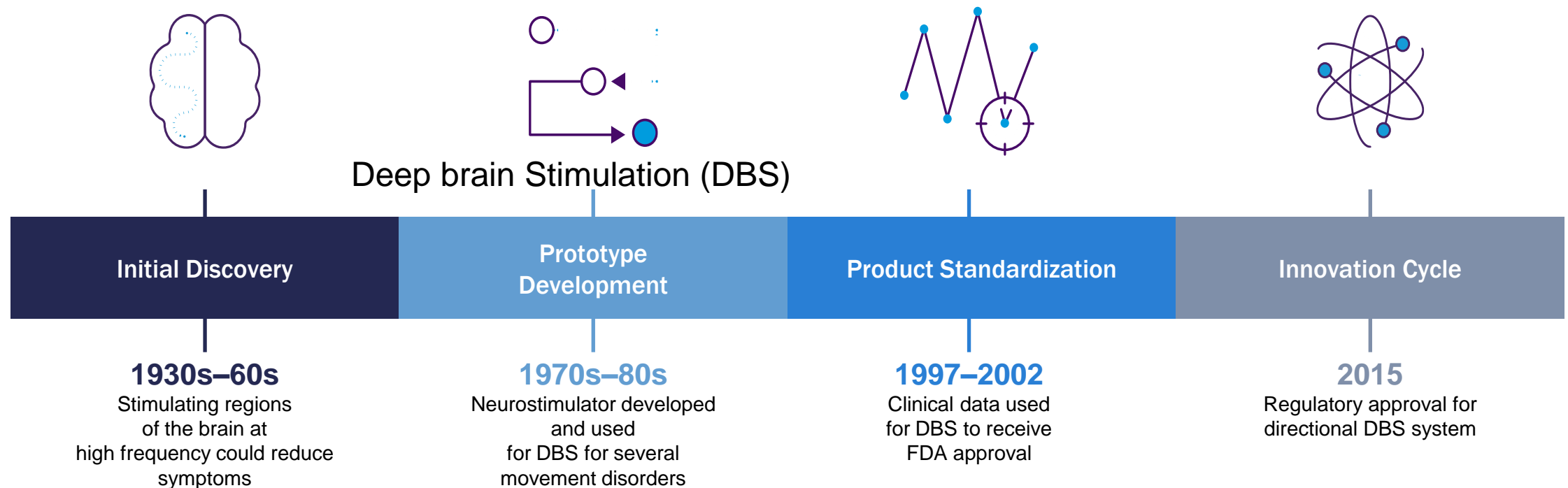
Focused Ultrasound (FUS)



- 1,000 ultrasound beams
- Non-invasive
- Creates focal lesion at target
- Approved for ET and PD tremor only



Deep Brain Stimulation (DBS)



DBS Indications

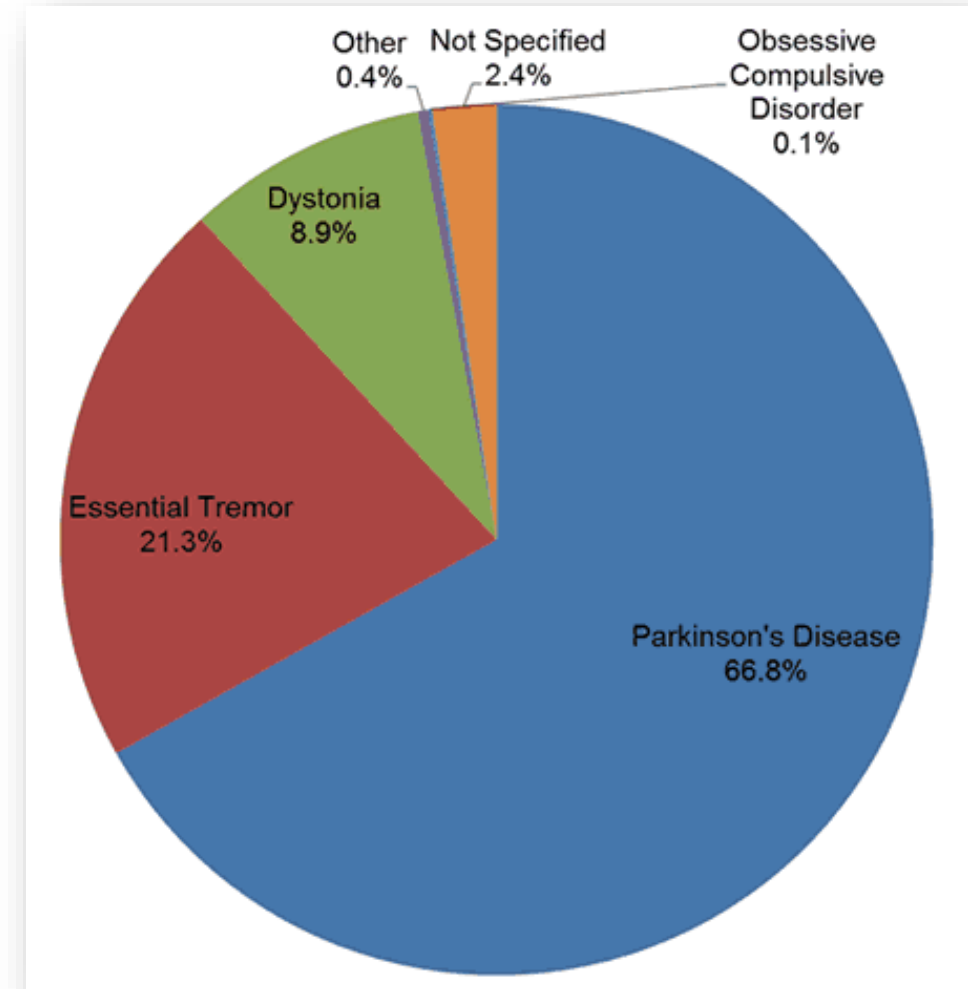
FDA indicated for:

- Parkinson's Disease
- Essential Tremor
- Dystonia

FDA approval:

- Essential tremor - 1997
- Parkinson's disease - 2002
- Dystonia - 2003

Covered by all insurance providers.



Implantable Systems Performance Registry (ISPR) for deep brain stimulation systems.
July 2009 - July 31, 2013.

Benefit For Our Patients

- **80-90%** subjective improvement
- **>60%** medication reduction
- **80%** improvement in “off” periods
- **10%** improvement in “on” periods
- 4.6 hours MORE on time without dyskinesia

Reduction in medications leads to decrease in the following:

- Cost
- Side effects (nausea, orthostasis, cognitive change, and downstream dyskinesia risk)

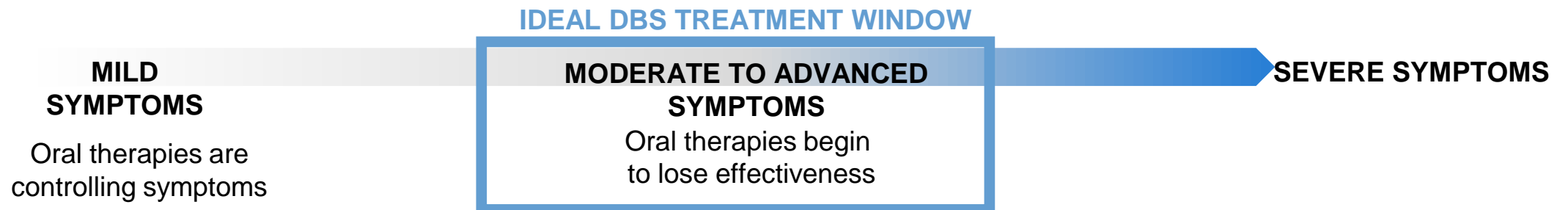


Who is a candidate?

A good candidate for DBS per our center:

1. Parkinson's Disease 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

**Also,
refractory
tremor in
Parkinson's
disease**



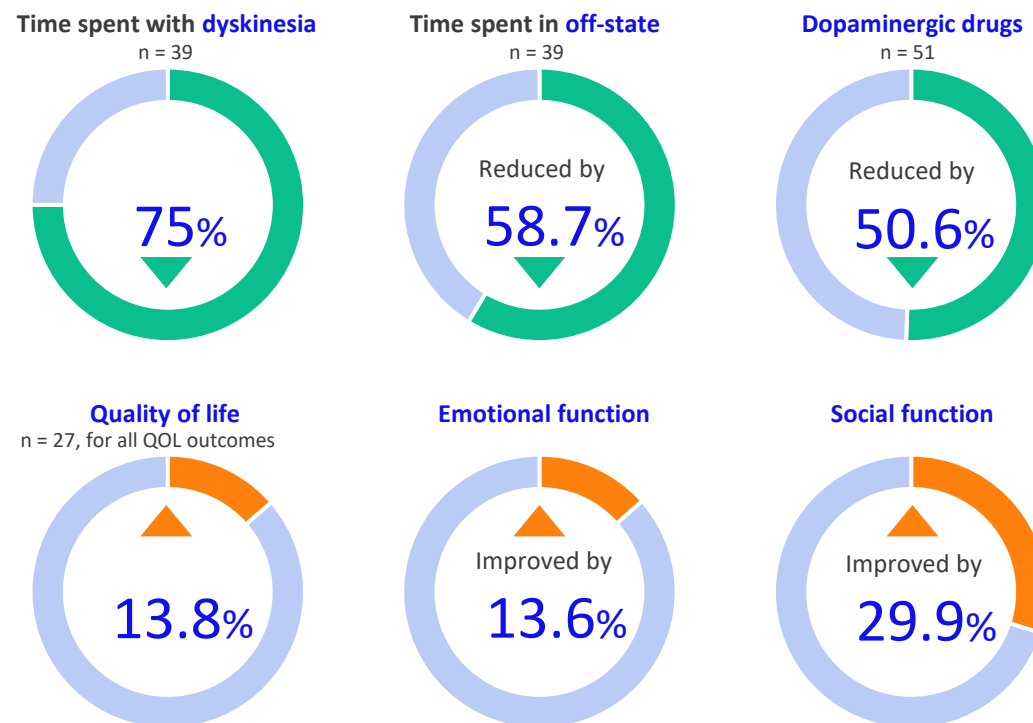
Schulepbach et al – Summary of results

Outcome	DBS therapy	Medical therapy	P value – Difference between treatment groups
Improvement in quality of life PDQ-39 summary index	+26%*	-1%	0.002
Improvement in motor score UPDRS-III (off medication)	+53%*	+4%	< 0.001
Improvement in activities of daily living (ADL)	+30%*	-12%*	< 0.001
Improvement in UPDRS-IV (levodopa-induced complications)	+61%*	-13%*	< 0.001
Increased hours of good mobility without troublesome dyskinesia (patient diary)	+20%*	+2%	0.012
Improved SCOPA-PS (Scales for outcome in Parkinson's Disease – PsychoSocial questionnaire)	+28%*	+3%	0.023
Within group change in daily levodopa-equivalent dosage	-39%*	+21%*	< 0.001

- Schuepbach WMM, Rau J, Knudsen K, et al. Neurostimulation for Parkinson's disease with early motor complications. *N Engl J Med*. 2013;368:610-22.

Long term effects of deep brain stimulation in PD

- 15 years and beyond after surgery:



How does DBS work?

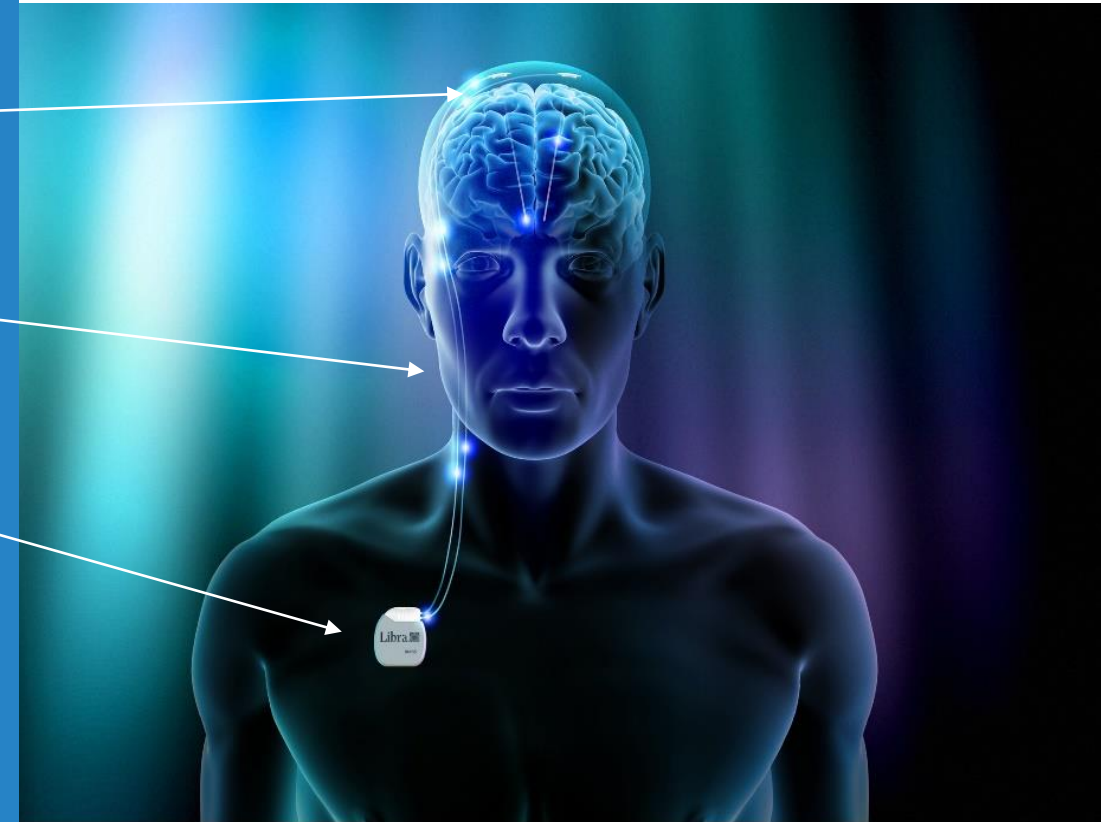
- Controlled stimulation of electricity to block electrical pathway.
- Surgeries for PD (pallidotomy or thalamotomy) and Focused Ultrasound destroys nerve cells, DBS does not.
- Programmable and adaptable, by MD and patient.
- Removable, if necessary, with little to no tissue damage.
- Standard of care.



Components?

The DBS system consists of three components:

1. Intracranial Lead
 2. Extension connecting lead and generator
 3. Implanted pulse generator (neurostimulator)
- Unilateral or bilateral leads
 - Proper patient selection is key



An expanding field – pick your fit

- Directional stimulation.
- Remote programming.
- Improved technology and wireless.
- Smaller technology, thinner.
- Longer battery life and rechargeable systems.
- Variety of rechargeable systems.



Different systems offer different features



- Directional DBS.
- Remote programming.
- Imaging integration.
- New rechargeable systems.
- Recording of brain activity.
- Different technology to aid programming.



Multidisciplinary Approach

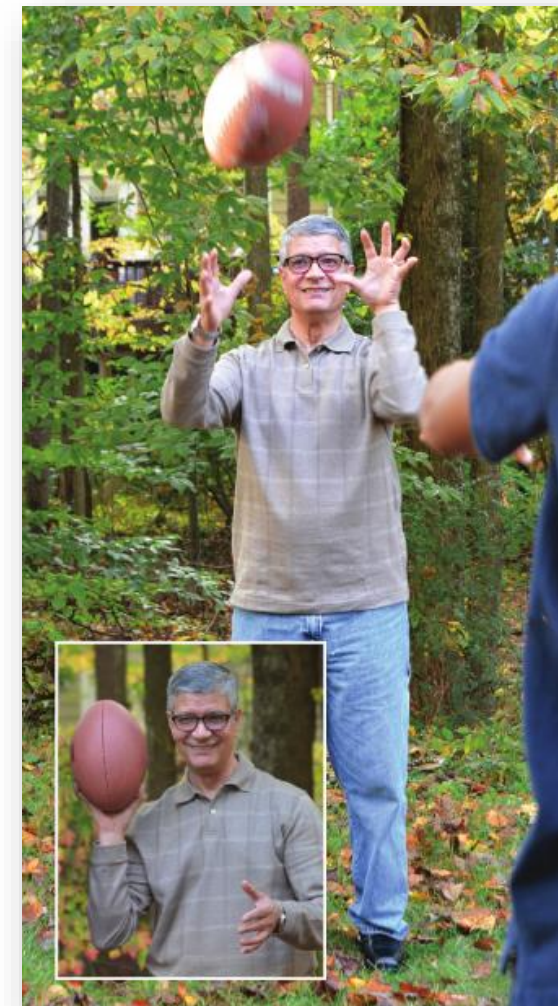
A team approach is key to a successful outcome.

- Cognitive evaluation
 - Full Neuropsychiatric testing
- Psychiatric evaluation, if necessary
- Physical therapy, occupational therapy and speech therapy
- Neurosurgical evaluation
 - Work together for pre-surgical planning
 - GPI vs STN, Unilateral vs Bilateral
 - Intra-operative cooperation
- Movement Disorders Specialist



In summary – DBS is standard of care

- Longstanding, well-studied tool.
- Therapy at the source.
- Adaptable, adjustable with no treatment horizon.
- Average implant – 12 years from diagnosis.
- FDA approved – 4 years from diagnosis.
- The gap? Education, training and comfort.



- Stanford University
- Vibratory feedback.
- Has potential to ease symptoms.
- Still early, in trials.



*Illustration by Harry Campbell from
Stanford Medicine Magazine's
'Can Parkinson's Symptoms Be Stopped?'*

Vibrating Glove

Next up

Roundtable
discussion on
this morning's
topics and Q&A!

You, Your Doctor and Parkinson's

Drew Falconer, MD

Director, Movement Disorders Specialist

Inova Parkinson's and Movement Disorders Center (IPMDC)



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Movement Disorders Center
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What's on tap?

- What is an MDS?
- Support team
- Interdisciplinary team
- Patient experience –
appointments,
communication,
hospital

What is a Movement Disorders Specialist (MDS)?

Clinical team:

Doctor - MDS vs Neurologist vs PCP

Fellowship training

An expert general neurologist ≠ a Movement Disorders Specialist

Physician Associate (PA)

Nurse Practitioner (NP)

Expanding access, expanding the team

Support Team

Nurses (LPN, RN)

Medical assistants

Front desk

Call center (answer messages and scheduling)

Insurance team – PA work (medications and injections)

Rehab specialists (PT/OT/SLT)

Home care / social work / case management

Research team

Inova Hospital Outpatient Rehabilitation Teams

Inova Alexandria Hospital

Inova Fairfax Hospital

Inova Fair Oaks Hospital

Inova Loudoun Hospital

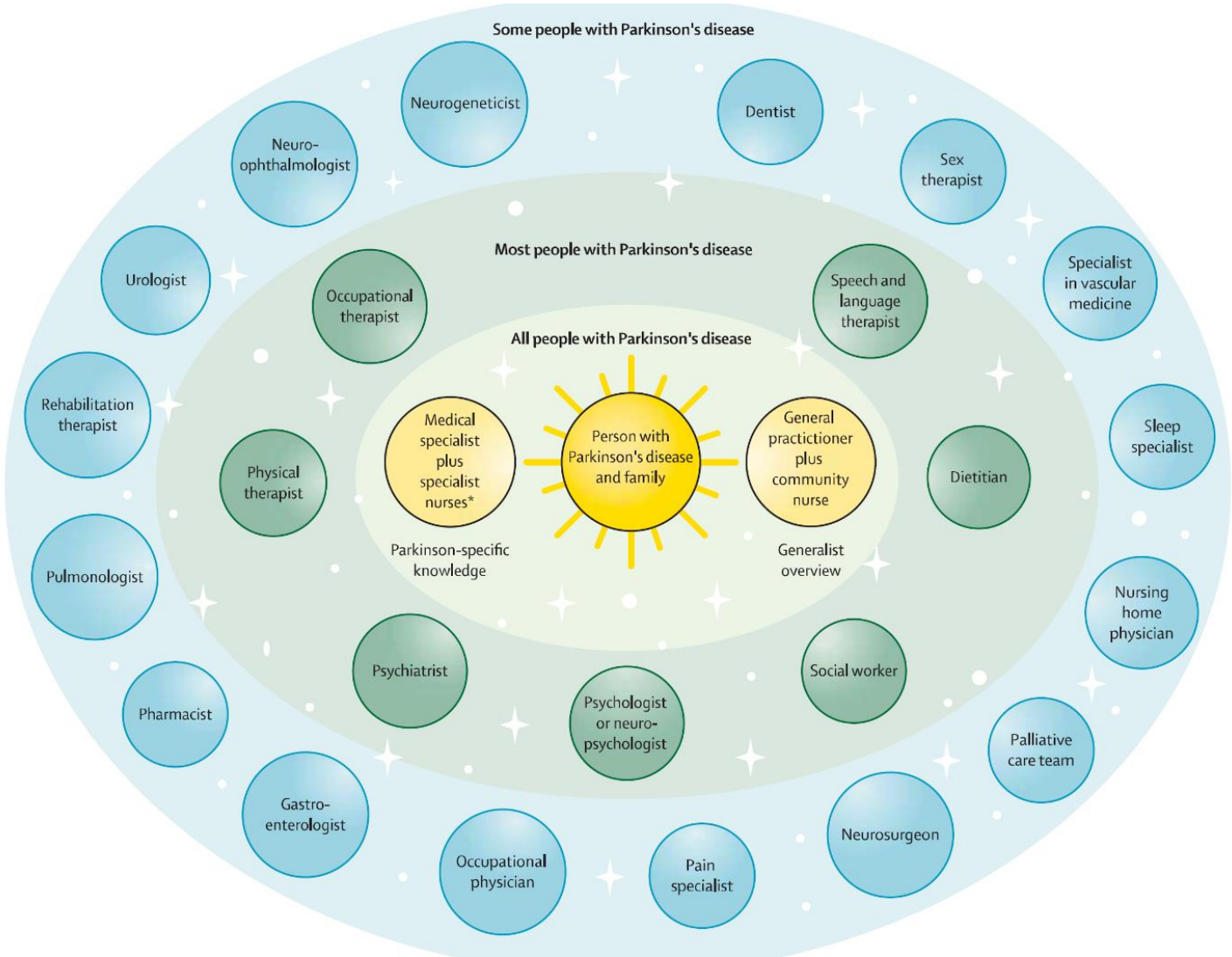
Inova Mount Vernon Hospital

Community-Based In Person and At Home Rehabilitation Teams

www.ipmdc.org/therapy

Patient Centered Care

- The essence of what a center aspires to be.
- What it means to us.
- Celebrating the highs, carrying you through the lows.
- Access and communication is KEY.



Telehealth

Reasons why telehealth makes sense with PD – MJFF study showed in 2023:

- 9% of PD patients see an MDS.
- 40% of PD patients receive care from PCP or no physician.
- 20% of Medicare patients travel outside of their hospital region for care.
 - Average drive of 148.7 miles.
 - Most common neurological condition who traveled: Parkinson's disease.
- Average wait time for a new patient MDS visit in US – 2.2 mo (2-8 mo).

Still an option at many centers!

How to Approach a Clinic Visit

- Be present, be confident, and contribute.
- Make a list and give to the doctor at the beginning.
- Ask questions.
- Resist the urge to be a good patient.
- **Speak up about what you can't do or would like to do but chose not to.**
- Leave with a plan.



How to Help Your Doctor Help You

Appointments

- Arrive 15 minutes early for check-in, vitals, medications review, etc.
- Bring a list of questions and concerns
 - **Give it to doctor at the beginning!
- Schedule next appointment at end of visit



How to Help Your Doctor Help You

Communication

MyChart is best

Phone

- Phone calls are slower, one call is plenty

Emergencies: call 911



Hospitalization of Parkinson's Patients

Medication timing is key

MJF Data – 95% of PD patients experience medication errors in hospital.

Where is the lapse?

TIMING of medication

- Specific administration time is key, little flexibility with carbidopa/levodopa.

CHANGING to formulary

- Sometimes not a 1:1 conversion, or reason for newer drug.
- Allow home meds please, and stick to plan

OVERLAY of illness blamed on Parkinson's

- Never stop or reduce their PD meds unless obviously the cause (just ask).

ADMINISTRATION of contraindicated medications



**Important Information
Related to the Care of Patients
with Parkinson's Disease**

For patients with Parkinson's disease, it is important that in addition to being treated for the condition that led to their hospitalization, their treatment for Parkinson's disease continues as prescribed by their neurologist.

We hope that the information outlined here will assist you to provide the care your Parkinson's patient requires for the best possible outcome.

MOST IMPORTANT:

Patients must take their Parkinson medications according to the schedule determined by their neurologist.

When You're in Hospital or Rehab

- You're in the care of the hospital medical team.
- We can consult with them, but only at their request.
- IPDMC Hospital leaflet at:
www.ipmdc.org/hospital

- Moving therapies forward.
- Altruism.
- More important now than ever.
- Components in person, virtual components as well
- Clean and safe.

Research is Important



Being Your Best

Hints for doing well:

- Teamwork is key, as is communication.
- Don't play doctor, but don't hesitate to ask. **MyChart works!**
- Take care of your part -> exercise, sleep, diet.
- **Keep moving!**
The best exercise is the kind that challenges you!
- Never be satisfied with "good enough."





Parkinson's and
Movement Disorders Center

Thank you.