


Parkinson's Disease
KP Update

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No disclosures

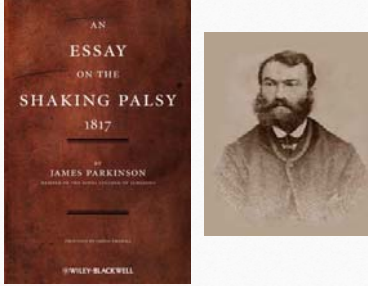
"I often say now I don't have any choice whether or not I have Parkinson's, but surrounding that non-choice is a million other choices that I can make."

- Michael J. Fox



Objectives

- Pathophysiology / Epidemiology
- Diagnosis and diagnostic challenges in PD
- Review the current medicinal and surgical treatments
- Offerings available at KP




Involuntary tremulous motion, with lessened muscular power, in parts not in action and even when supported; with a propensity to bend the trunk forward, and to pass from a walking to a running pace; the senses and intellects being uninjured.

Parkinson's Disease

Neurodegenerative disease, typically found later in life, linked to decreased dopamine production in the substantia nigra.

Marked especially by tremor of resting muscles, rigidity, slowness of movement, impaired balance, and a shuffling gait.




Epidemiology

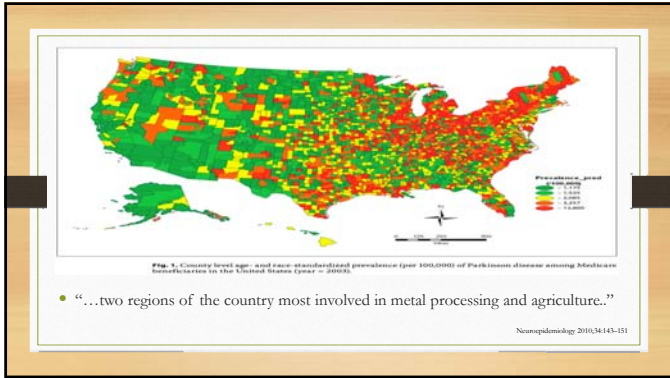
1 – 2 million Americans
7 – 10 million worldwide

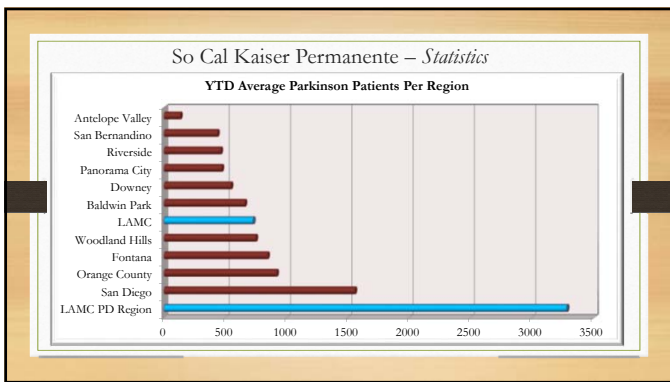
Risks (incidence)

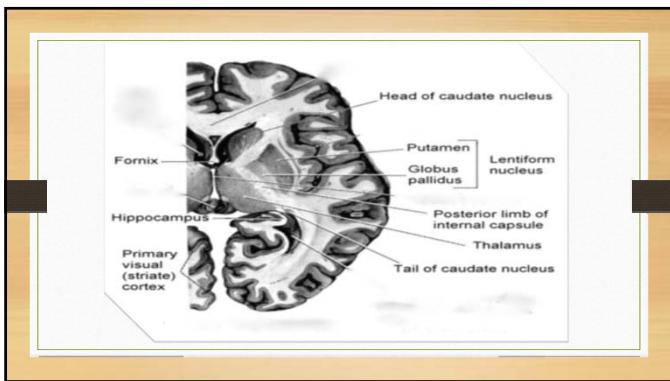
- 17.4 in 100,000 persons (age 50-59)
- 93.1 in 100,000 persons (age 70-79)



Lancet 2009; 373: 2055-66







Basal Ganglia

- Integrate and process information from cortex
- Provide feedback via the thalamus
- Works via direct and indirect pathways

Alexander, Annu Rev Neurosci. 1986;9:337-81.

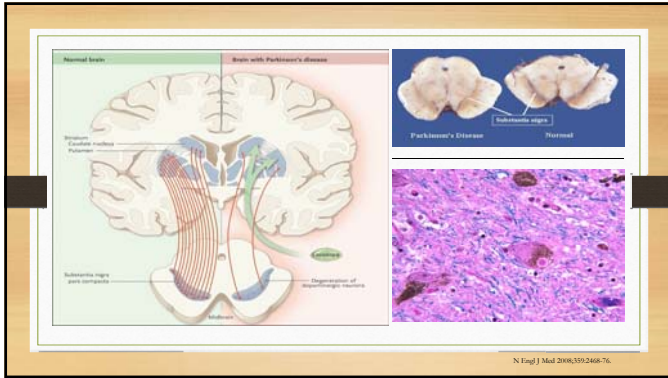
Basal Ganglia

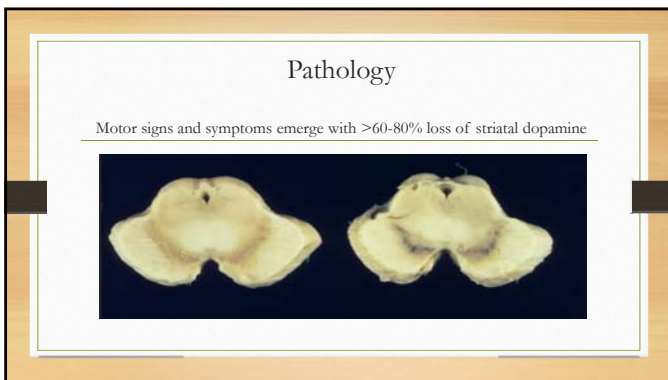
- Excitatory neurons
- Inhibitory neurons

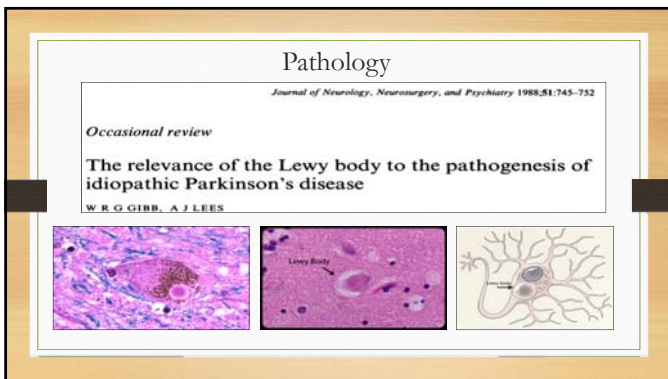
Exp Brain Res. 2011 Apr;210(2):165-72.

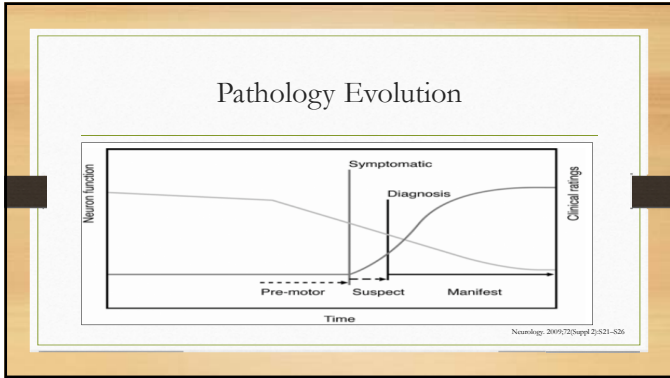
Basal Ganglia

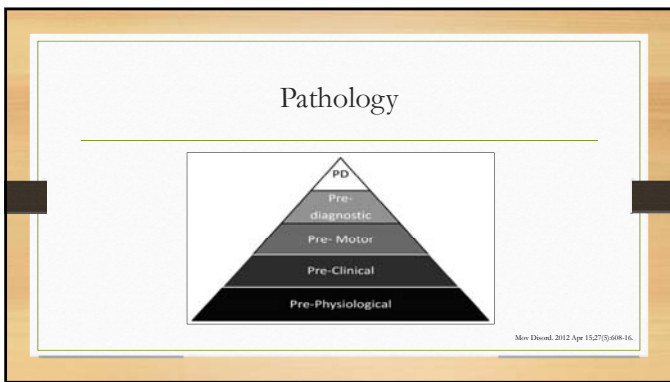
Front Neurosci. 2011;5:39.

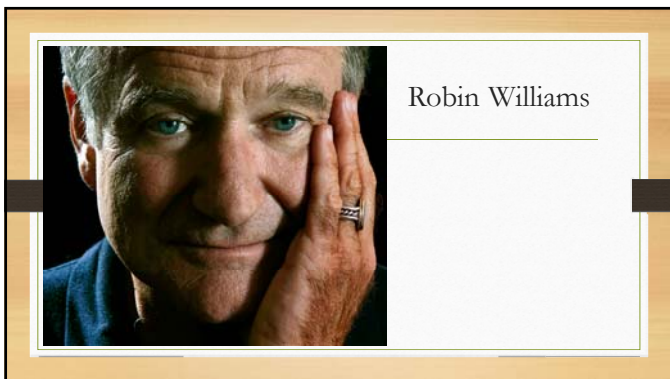








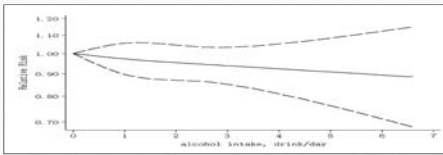




Associations with Parkinson's

- Protective factors?
 - Smoking
 - Coffee (caffeine)
 - NSAIDs
 - Exercise
 - Urban dwelling
 - Regular stools
 - Increased uric acid
 - Alcohol
- Associated factors
 - Farming
 - Teaching
 - Healthcare work
 - Well water
 - Family history
 - Risky behavior
 - Male





Decreased risk with alcohol consumption

Moore et al. 2014 May;29(5):819-22.



Muhammad Ali
Diagnosed in 1984
75 yo



Problems facing providers

- Uncertainty of diagnosis
- Patients can have 19 different specialists
- Unsure if PD symptoms or not
- What to expect next as course progresses
- How to improve quality of life in patients
- Not enough PD patient experiences
 - Not asking the right questions
 - Not getting the right answers
- Unclear of guidelines and red flags



PD – Diagnosis

- | | | |
|--|--|--|
| <ul style="list-style-type: none"> • Motor Symptoms • Tremor • Rigidity • Akinesia (bradykinesia) • Postural Instability | <ul style="list-style-type: none"> • Non-Motor Symptoms • Hyposmia • Mood changes • Cognitive disorder • Psychosis (visual / auditory) | <ul style="list-style-type: none"> • Orthostatic Hypotension • RBD • Bowel / Bladder disorders • Sexual Disorders • Weight control • Impulse control |
| <ul style="list-style-type: none"> • Mixed Symptoms • Speech & swallowing difficulty • Drooling | | |

Reasons for Diagnostic Uncertainty

- | | |
|---|---|
| <ul style="list-style-type: none"> • Mild intensity of signs • Only one sign • One sign with asymmetry • Two signs but no bradykinesia • Lack of progression over time | <ul style="list-style-type: none"> • Atypical signs • Postural rather than rest tremor • Mild rigidity • Doubtful bradykinesia • Little or no response to levodopa |
|---|---|

Diagnostic Accuracy in PD

Journal of Neurology, Neurosurgery, and Psychiatry 1992;55:107-110

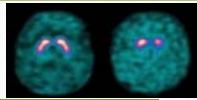
Accuracy of clinical diagnosis of idiopathic Parkinson's disease: a clinico-pathological study of 100 cases

Andrew J Hughes, Susan E Daniel, Linda Kilford, Andrew J Lees

Table 3 Pathological findings in 24 cases clinically mis-diagnosed as Parkinson's disease

Pathological findings	No of cases
Progressive supranuclear palsy	6
atypical	4
classical	2
Multiple system atrophy	5
Alzheimer's disease	3
with striatal involvement	1
without striatal involvement	2
Alzheimer-type pathology	3
with striatal involvement	3
Vascular, lacunar state	3
Nigral atrophy without Lewy bodies	2
Postencephalitic parkinsonism	1
Normal essential tremor	1

Dopamine Transporter SPECT (DAT Scan)



- Distinguish Parkinsonism due to presynaptic dopaminergic loss from other causes
- Dopamine transporter imaging:
 - May improve diagnostic accuracy in clinically uncertain syndromes
 - May improve diagnostic confidence
 - May have a strong influence on clinical management of patients
 - May allow earlier diagnosis of patients with PS

TABLE 2. Ancillary tests that can be used to diagnose pre-clinical PD

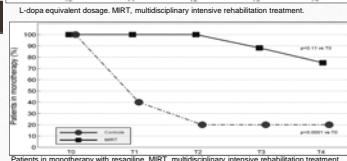
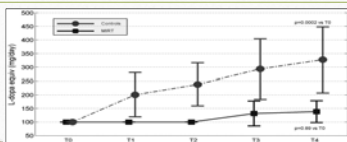
Test	Sensitivity	Specificity	Availability	Cost
Olfactory testing	++	+	Broad	Low
Neuropsychological testing	+	-	Broad	Moderate
Transcranial ultrasound	++	+	Restricted	Moderate
Cardiac MIBG imaging	+	++	Broad	High
Dopamine transporter SPECT	++	++	Restricted	High
[18F]fluorodopa PET	++	++	Restricted	High
Genetic testing	-	++	Restricted	High

- Not clinically useful; + somewhat useful; ++ sufficiently accurate to be useful; because PD is so rare, only highly specific tests provide useful information.

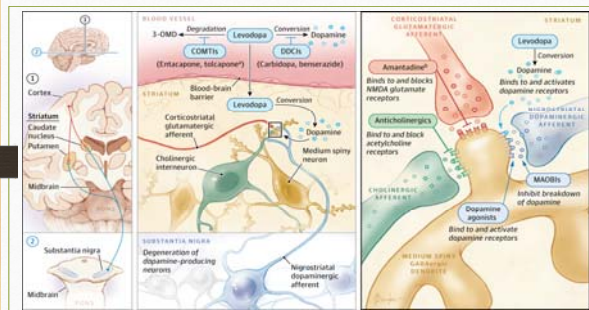
Mov Disord. 2012 Apr;15(27):698-16.

Treatment Principles

- Primary Treatment – anything that is established as Neuroprotective
 - Exercise?
- Tailor treatment to the idea that this is a chronic disease
- Expect to change treatments as symptoms progress / change
- Keep patient functioning independently as long as possible
- Patients should be encouraged to remain physically active, mentally active, and take an active role in their care



Neurohabilit Neural Repair 29, 123-131.


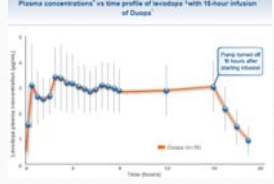


Parkinson Medication Treatments

- L-dopa derivatives
 - Carbidopa – Levodopa (CR)
 - Rytary
- COMT – Inhibitors
 - Entacapone (Comtan)
- Dopamine Agonists
 - Ropinirol (ER) // Pramipexole(ER)
 - Rotigotine (Neurpo) patch
- MAO-Inhibitors
 - Rasagiline (Azilect)
 - Selegiline
 - Safinimide (Xadago)
- Acetylglutamate Inhibitors
 - Amantadine

Motor Fluctuations

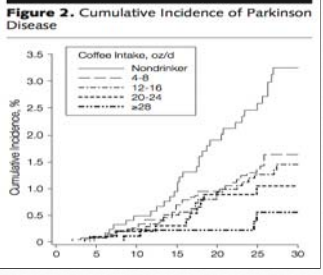
Duopa Pump *(external pump with consistent levodopa infusion)*

Adenosine

- 30 years of follow-up of 8004 Japanese-American men
- Higher coffee and caffeine intake is associated with a significantly lower incidence of PD.
- Caffeine is a non-selective adenosine antagonist


Figure 2. Cumulative Incidence of Parkinson Disease



JAMA. 2006;295(26):2674-2679

Deep Brain Stimulation

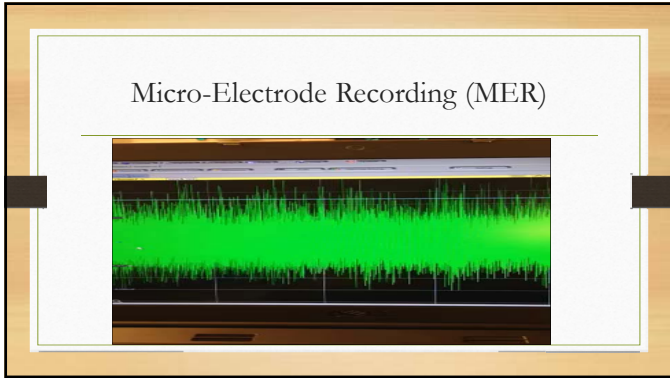
Intervention	Baseline (n=48)	6 Mo (n=43)	12 Mo (n=38)	18 Mo (n=33)	24 Mo (n=28)
Medication	17	12	11	10	9
DBS	31	31	27	23	19
Total	48	43	38	33	28

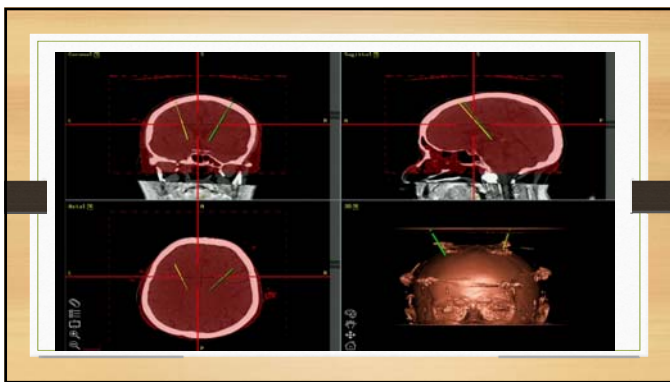


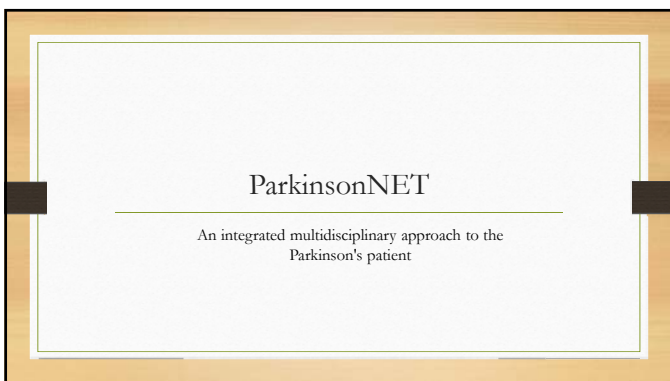
Legend: ■ Medication, ■ DBS, ■ Total

■ Male with unilateral disease, ■ Male with bilateral disease, ■ Female with unilateral disease, ■ Female, ■ Deaf

Source: [unreadable]







And... why?

TABLE 1. Patient-perceived relevant problems and the consultation of allied health care to counteract these problems

Domain	Patient relevant problems* (n = 216)	Allied health care utilized for relevant problems**			
		% PT	% OT	% ST	% No AHC
Arm/hand activities*	118 (54.6%)	23.7	1.7	1.7	72.8
Gait	116 (53.7%)	66.4	2.6	-	35.3
Transfers	115 (53.2%)	56.6	2.7	-	43.1
Balance	103 (47.7%)	56.4	2.0	-	41.6
Posture	98 (45.4%)	61.9	2.1	-	39.2
Leisure activities	89 (41.2%)	21.3	-	20.0	78.6
Speech	80 (36.9%)	-	-	-	80.0
Personal care	79 (36.6%)	-	2.6	-	97.5
Domestic activities	78 (36.0%)	-	1.3	-	98.7
Work activities	70 (32.4%)	20.0	1.4	2.9	75.8
Dressing	66 (30.6%)	-	-	6.1	95.4
Eating	43 (19.9%)	-	-	9.3	90.7

*Patient relevant problem, problem in both the performance of an activity and willing to improve this activity.
 **Percentage of number of patients with relevant problems.

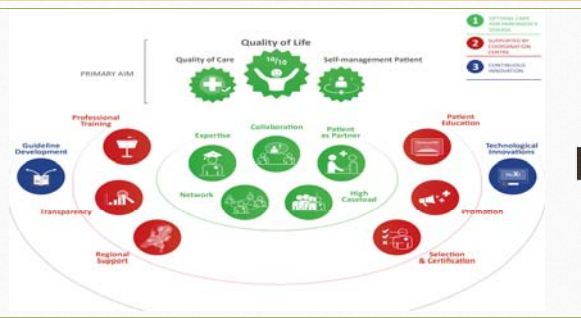
*Including reaching and grasping.

PT, physical therapy; OT, occupational therapy; ST, speech therapy; AHC, allied health care.

So what you're trying to say is...

TABLE 2. Characteristics of allied health care professionals categorized into specific PD expertise (experts) and no specific PD expertise (non-experts)

Professional characteristics	Physical therapists (n = 86)*		Occupational therapists (n = 12)		Speech therapists (n = 17)	
	Experts	Non-experts	Experts	Non-experts	Experts	Non-experts
N (%)	17 (19.8)	66 (80.2)	3 (25.0)	9 (75.0)	3 (17.6)	14 (82.4)
PD patients treated, number (%)	119 (35.4)	217 (64.6)	28 (49.1)	29 (51.9)	12 (21.8)	43 (88.2)
Work setting						
Primary care (%)	100	100	33.3	0	66.7	50.0
Institutional care (%)	17.6	6.1	100	100	66.7	50.0
Work experience in years, mean (±SD)	21.2 ± 7.0	18.6 ± 8.1	9.7 ± 2.5	10.8 ± 11.4	17.7 ± 5.7	16.5 ± 9.8
PD patients treated yearly, mean (±SD)	7 ± 7.4	3.3 ± 2.7	9.3 ± 6.0	3.2 ± 1.0	4 ± 1.7	3.1 ± 2.7
% Education on PD	35.3	10.6	0	22.2	66.7	14.3
Familiarity with other treatment options						
Familiar with speech therapy (%)	35.3	6.1	33.3	0	66.7	7.1
Familiar with occupational therapy (%)	47.1	4.5	33.3	0	33.3	7.1
Familiar with neurological treatment (%)	35.3	19.7	66.7	0	66.7	0
Familiar with PD nurse specialist (%)	17.6	1.5	33.3	0	33.3	0



ParkinsonNet Approach



- Physical Therapy
- Occupational Therapy
- Speech Therapy
- Dietitian
- Social Worker
- Networking groups together

ParkinsonNet Medical Team

- Medication adjustment
 - Starting / stopping / adjusting
- Education
- Counseling
- Appropriate referrals
- Eval for next steps
- PDQ – 39 questionnaire
- Collaborative decision making

- Los Angeles Kaiser
 - 2 – Neurology Movement Specialists
 - 2 – Neurology / Neurosurgery PAs
 - 1 – Neurosurgeon for DBS
 - Regular rotation of NS residents
 - 1 – Nurse Case Manager
 - 1 – Neuropsychologist (testing)
 - 1 – Social worker
- Outside LAMC
 - 6 – Neurology Movement Specialists



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A Patient-Centered Approach



