

Parkinson's Disease and outpatient rehabilitation

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Hotel Dieu Shaver

1. Financial Disclosure

NONE

2. Unlabelled / Unapproved Use Disclosure

NONE

Objectives

- Discuss **clinical features** of Parkinson's disease
- Discuss **medical management** of Parkinson's disease
- Discuss **rehabilitation** of Parkinson's disease

Outline – Parkinson's Disease

- Pathophysiology
- Clinical features
- Medical management
- Invasive management
- Outpatient rehabilitation

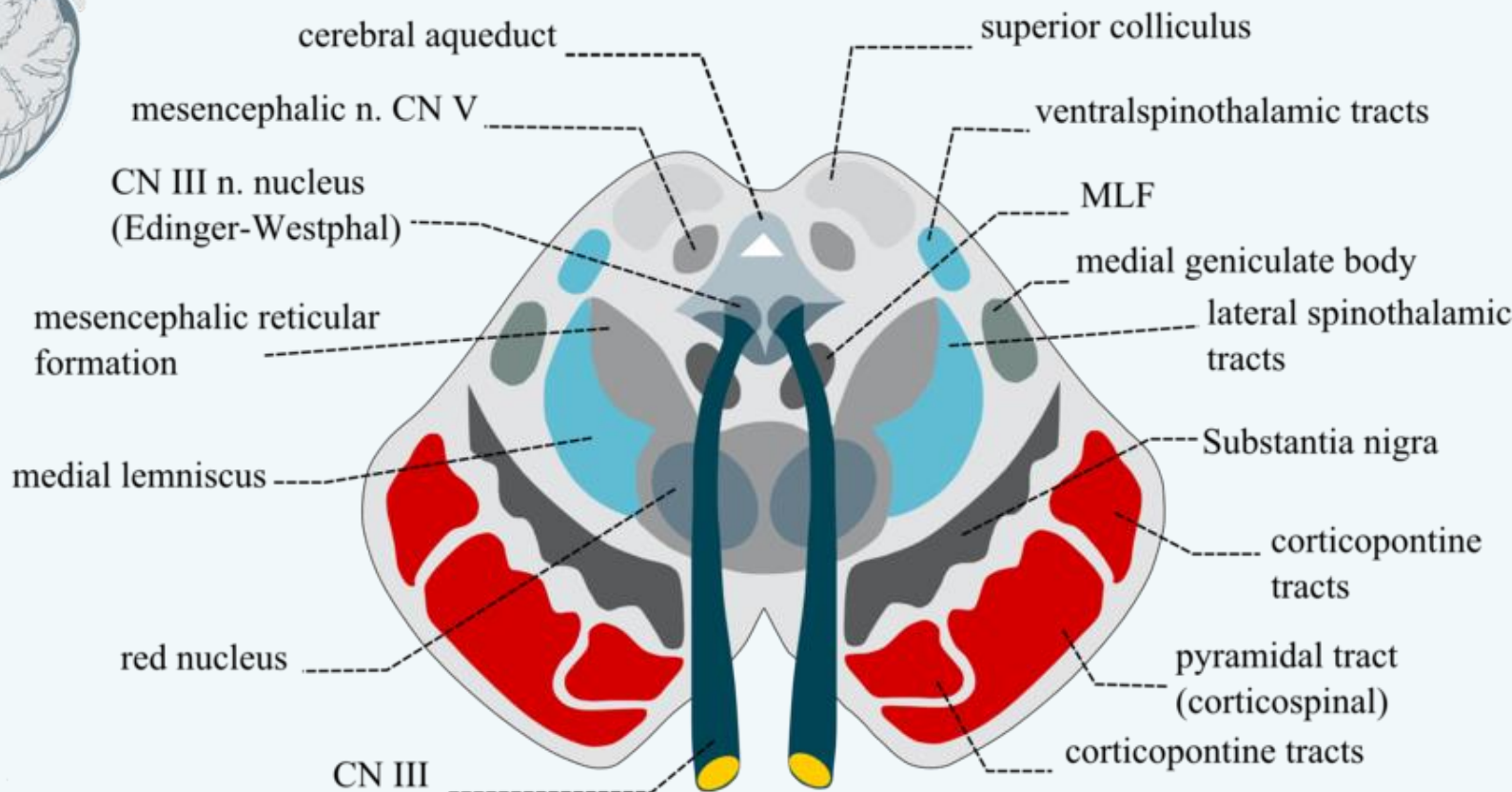
Outline – Parkinson's Disease

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Parkinson's Disease

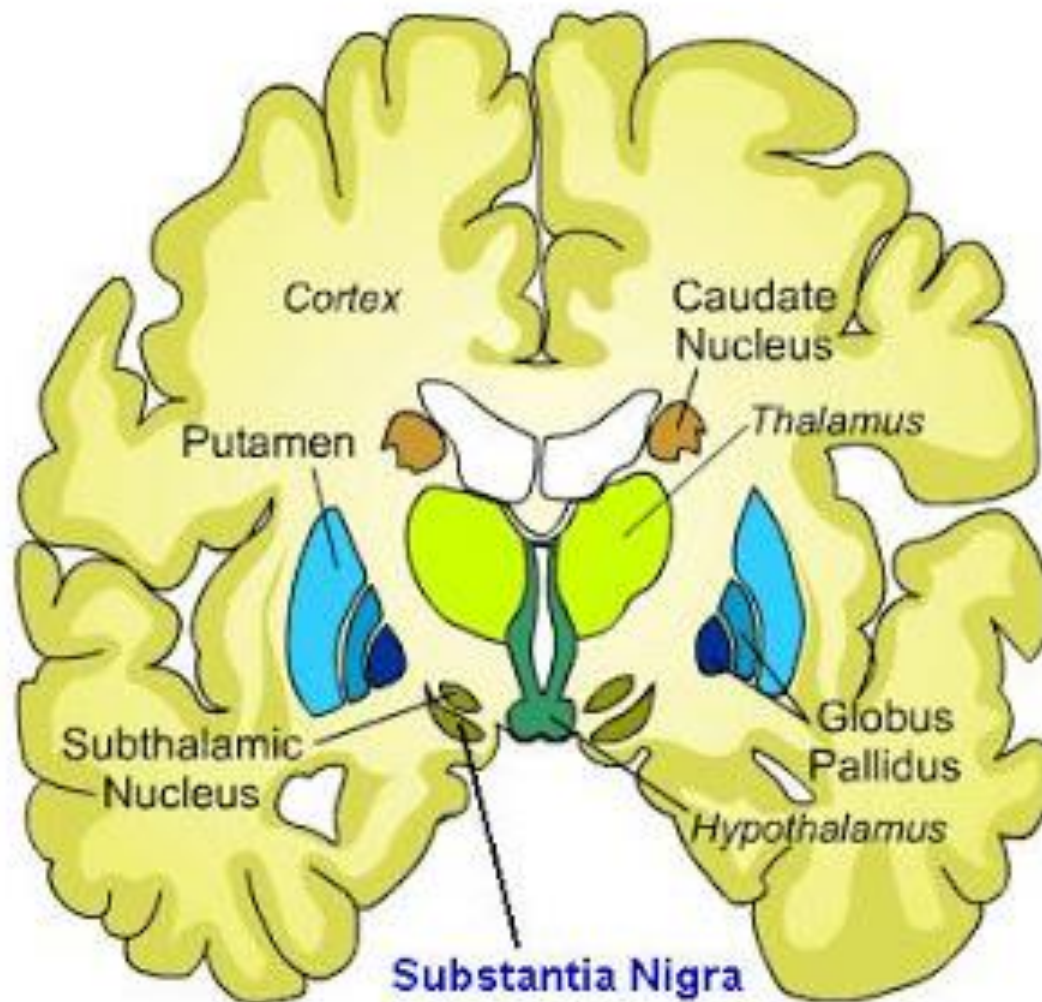
- Affects 1% of people over the age of 60
- Causes progressive disability
- 2 most common causes:
 - Loss of dopaminergic neurons in substantia nigra
 - Presence of Lewy bodies
- Environmental factors:
 - Pesticides, herbicides, wells
 - Caffeine protective?
- Mutations in 18 loci in various genes

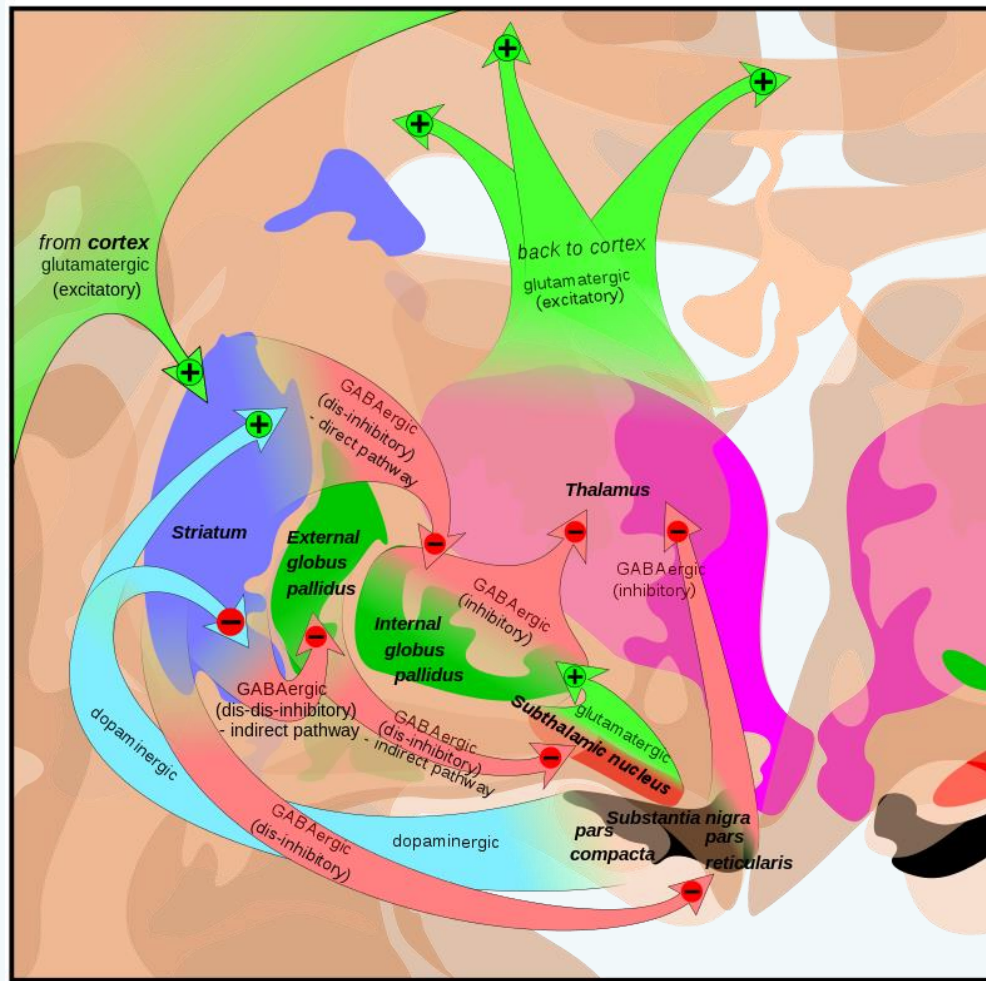
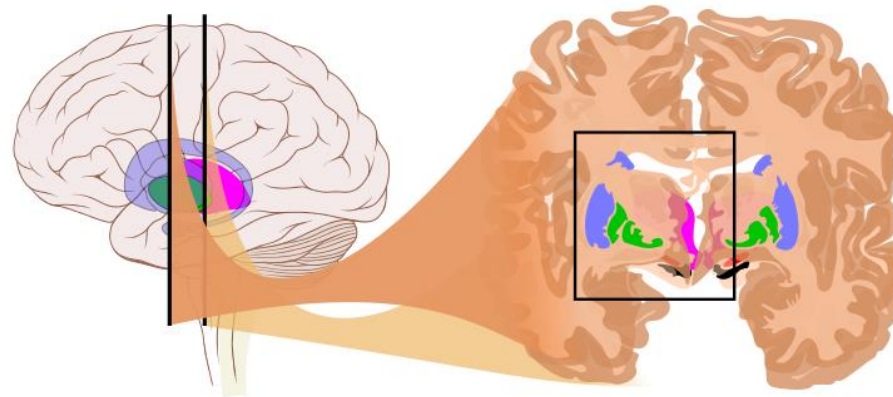
Parkinson's Disease



Parkinson's Disease

Basal Ganglia: Substantia Nigra, Putamen, Caudate Nucleus, Globus Pallidus





Outline – Parkinson's Disease

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Initial clinical symptoms :

- Tremor
- Subtle decrease in dexterity
- Decreased arm swing on the first-involved side
- Soft voice
- Decreased facial expression
- Sleep disturbances
- Rapid eye movement (REM) behavior disorder
- Decreased sense of smell
- Autonomic dysfunction (eg, constipation, sweating abnormalities, sexual dysfunction, seborrheic dermatitis)
- Depression or anhedonia
- Slowness in thinking

Cardinal motor signs:

- Tremor – 70% of patients T
 - Rigidity (stiffness) R
 - (A) Bradykinesia (slowness) A
 - Postural instability (later on in course) P
-
- PD = clinical diagnosis!
 - Usually 2 of the first 3 are required for diagnosis

Parkinson's Disease

Tremor:

- Resting
- 70% of the patients
- One of the cardinal features of PD
- Usually one limb initially (UE), may progress to other limbs later

Parkinson's Disease

Rigidity:

- Stiffness about a joint
- Velocity independent
- Leadpipe/ cogwheeling (oscillating)

Parkinson's Disease

Bradykinesia

- Slowness of movement (decreased speed)
- Decreased amplitude
- Decreased spontaneous movement
- Micrographia
- Hypomimia (decreased facial expression)
- Hypophonia (soft speech)

Parkinson's Disease

Postural instability:

- Later in the disease
- Loss of righting reflexes
- Risk of falls

Parkinson's Disease

Differential diagnoses:

- MSA
- PSP
- CBD

Investigations:

- None sensitive for PD
- Only to r/o other disorders as needed

Outline – Parkinson's Disease

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Medications (mainly motor) = DOPA

- Levodopa (+ carbidopa)
 - gold standard for symptoms
 - SE: fluctuations (wearing off), dyskinesia
- COMT inhibitors (entacapone) – inhibit peripheral metabolism of levodopa
- MAOB inhibitors (selegiline) - inhibit metabolism of brain dopamine
- Dopa agonists (pramipexole, ropinirole)

Parkinson's Disease

Other medications (mainly motor):

- Anticholinergics
 - for tremor
 - SE: cognitive deficits
- Amantadine
 - Antiviral that potentiate CNS dopaminergic responses

Parkinson's Disease

Medications (nonmotor) – 2010 AAN:

- Sildenafil – erectile dysfunction
- PEG lyte – constipation
- Modafinil – daytime somnolence

- Sialorrhea – ?botox, gum
- Dystonia - ?botox
- Fatigue - ?ritalin

Parkinson's Disease

Medication related issues

- After 4-6 years/more on dopamine meds
- ON/OFF phenomenon
 - In time, the DOPA meds lead to less ON and more OFF
 - May give the IR more frequently or switch to CR
- Peak dose dyskinesia
 - Dyskinesia at peak plasma concentration of the dopamine meds

Parkinson's Disease

Medication related issues

- ON/OFF
- Peak dose dyskinesia
- The trick is to prescribe enough dopamine (amount and frequency) to control the motor signs and avoid dyskinesia
- Easier said than done...help from movement disorder neurologist!

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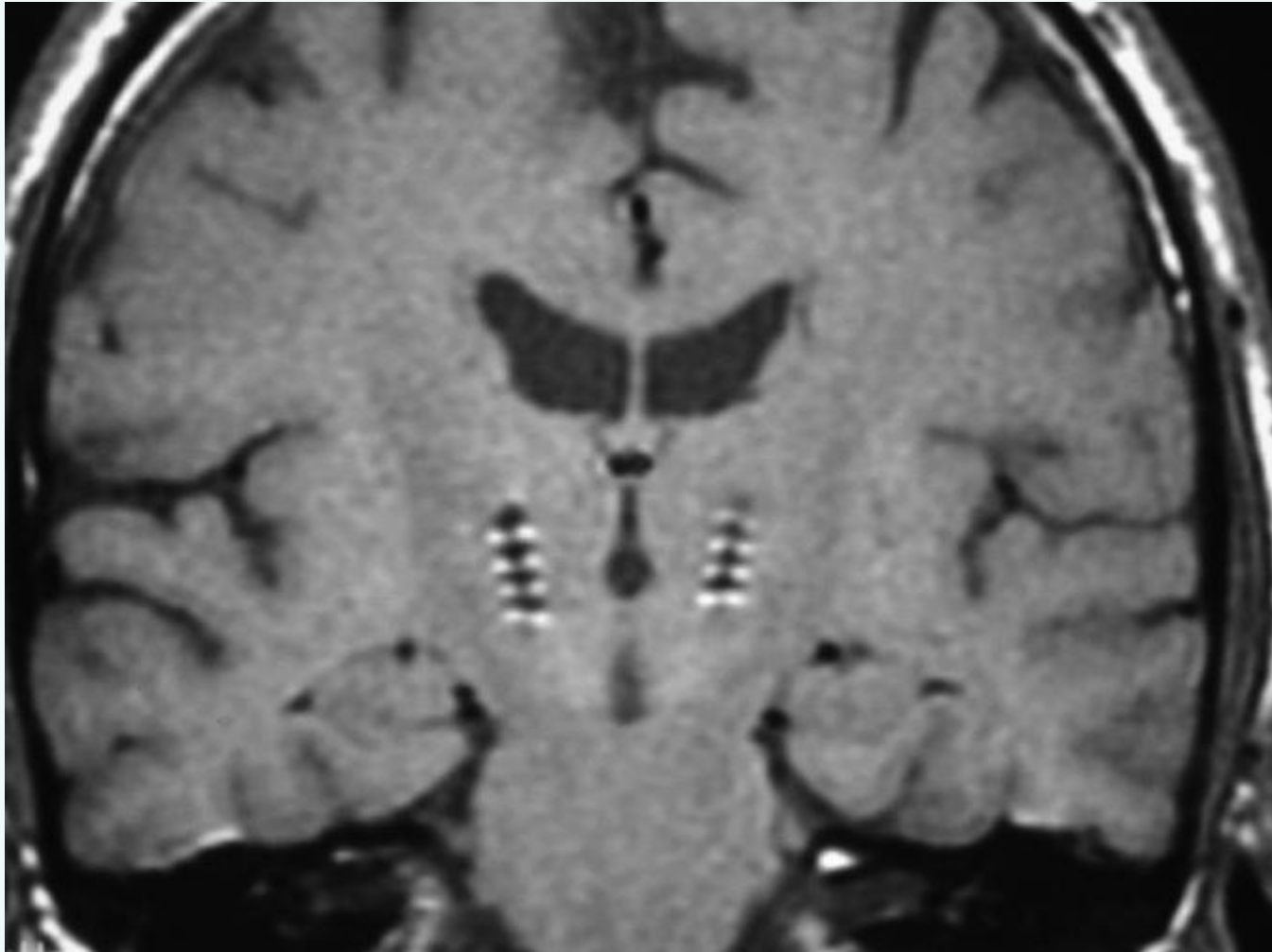
Parkinson's Disease

Invasive procedures:

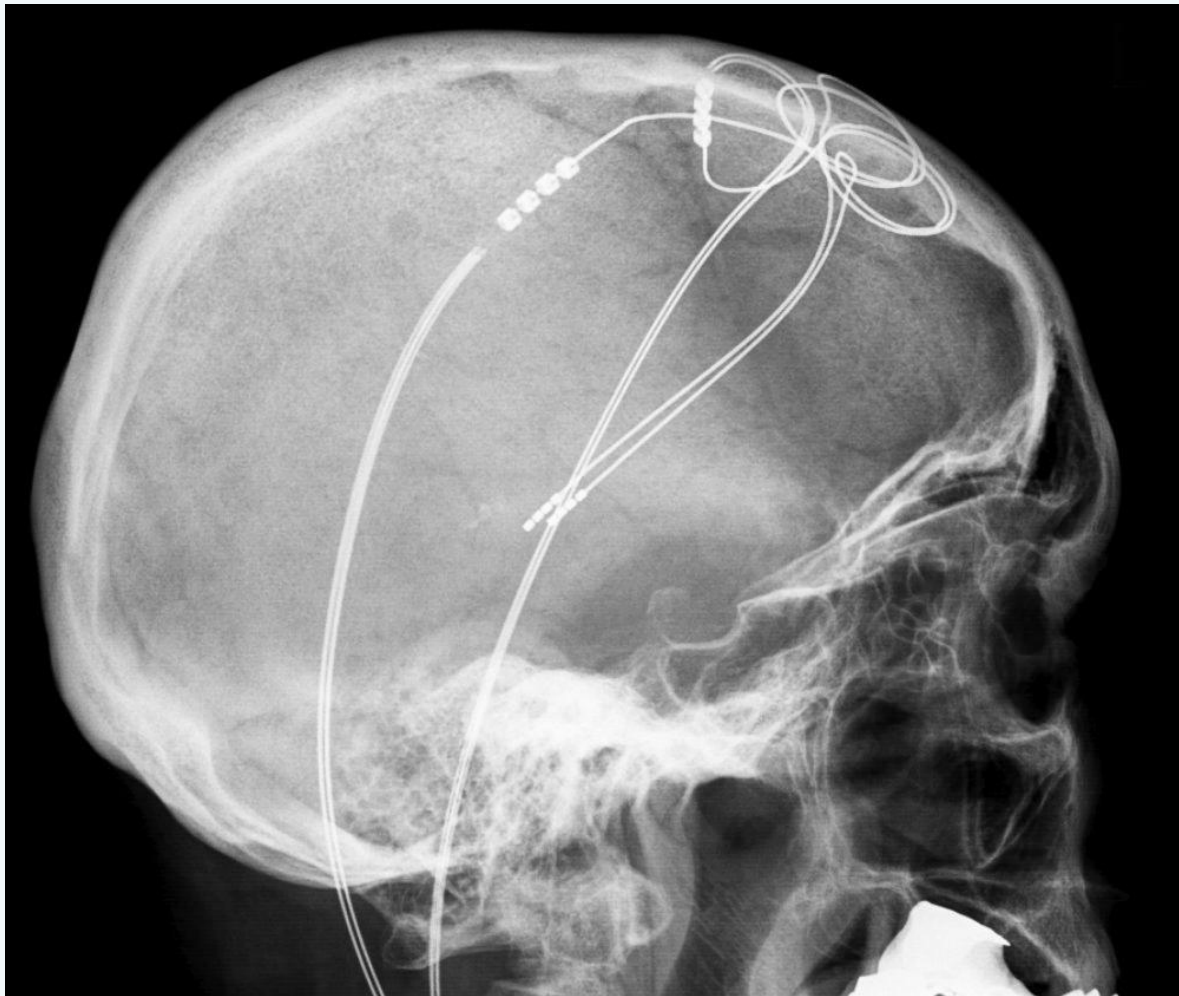
- Deep Brain Stimulation – STN
- Thalamotomy
- Pallidotomy

Bilateral DBS

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Bilateral DBS



Outline – Parkinson's Disease

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The next slides were prepared by:

Beverley Chow MD, BHSc

PGY3, Physical Medicine & Rehabilitation
McMaster University

MULTIDISCIPLINARY REHAB IN PD

Improved outcomes post inpatient programs

Monticone et al (2015)

- 70 patients, 2 months RCT
- ↑ UPDRS, ↑ Berg Balance
- **↑ motor fxn, balance, ADLs, QOL, even at 1 year**

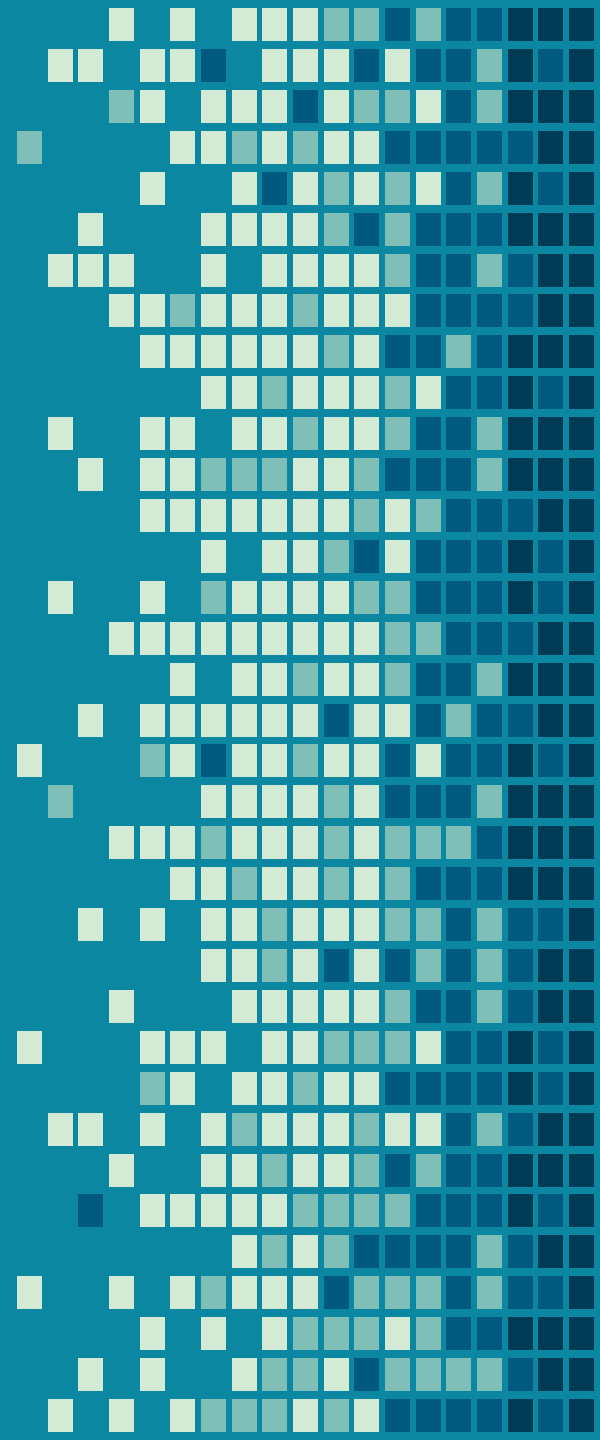
Ellis et al (2008)

- 68 patients
- ↑ FIM (27.7 motor, 4.1 cognitive),
↑ 2MW (21.m), ↑ TUG (19.8s), ↑ Finger taps (19.2)
- **71% of subjects had clinically important differences**



“

*Does an outpatient
multidisciplinary
rehabilitation program
improve **motor
outcomes and
functional
independence** in
**Parkinson's
Disease?***



HOTEL DIEU SHAVER PROGRAM

- **6 week outpatient** program in St. Catharine's, ON
- **2 three-hour sessions/week**
 - 2 hours with individual allied health
 - 1 hour education
- **Multidisciplinary** (PT, OT, Nursing, SLP, SW)
- Weekly team rounds



QUALITY IMPROVEMENT STUDY



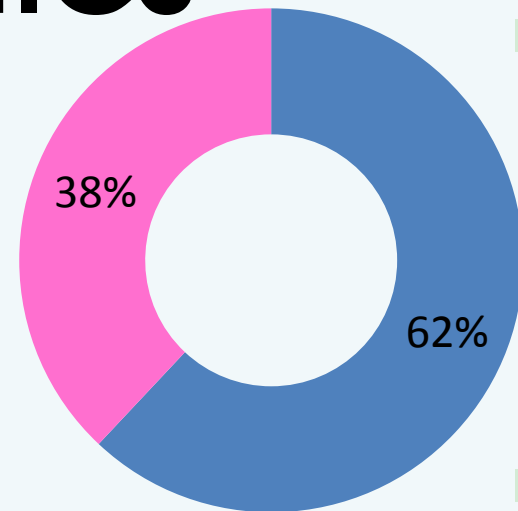
- **179 patients** (June 2013 – May 2017)
- 8 patients enrolled in program at a time
- Physician referrals only (GP, PM&R, Neuro)
- Initial screen based on **inclusion criteria**

INCLUSION CRITERIA

- ✓ Confirmed diagnosis of PD (by neurologist)
- ✓ Age > 18
- ✓ Resident of Niagara region
- ✓ Medically stable
- ✓ Able to attend program (responsible for transportation)
- ✓ Manage own toileting (or accompanied by caregiver)
- ✓ Motivated & willing to participate
- ✓ Ability to set goals
- ✓ Tolerate 3h of activity

DEMOGRAPHICS

- **Age**
 - Males 43-89 (mean 73.75)
 - Females 54-86 (mean 71.96)
- **Disease Severity:** variable (unknown)
- **Disease duration:** variable
 - 0-21 years (mean 6.5 yrs since dx)
- **Meds as prescribed**

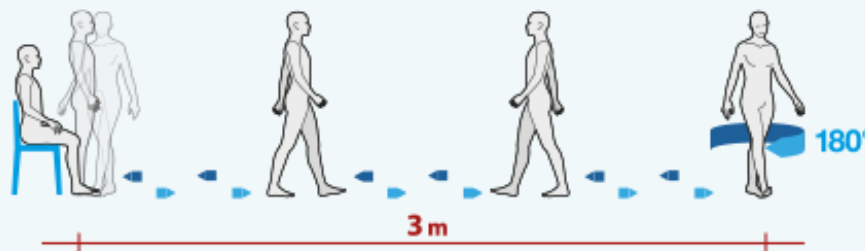


■ Male
■ Females

PRIMARY OUTCOMES

1. TIMED UP & GO [TUG] (secs)

- Time to rise from chair, walk 3m, turn, walk back & sit
- **Measures:**
 - Functional mobility & gait
 - Non-vestibular balance (static, dynamic)
- **Interpretation:**
 - <10s = Normal
 - >20s = Needs ↑ assistance, exam, intervention
- **Propensity to fall:** >11.5s – 14 secs



PRIMARY OUTCOMES

2. SIT TO STAND x5 [STS] (secs)

- Time to stand and sit down on a chair 5 times (quickly)
- **Measures:**
 - Functional lower limb muscle strength
 - Mobility
- **Interpretation:**
 - >14s = associated with
 - ↑ disease & morbidity



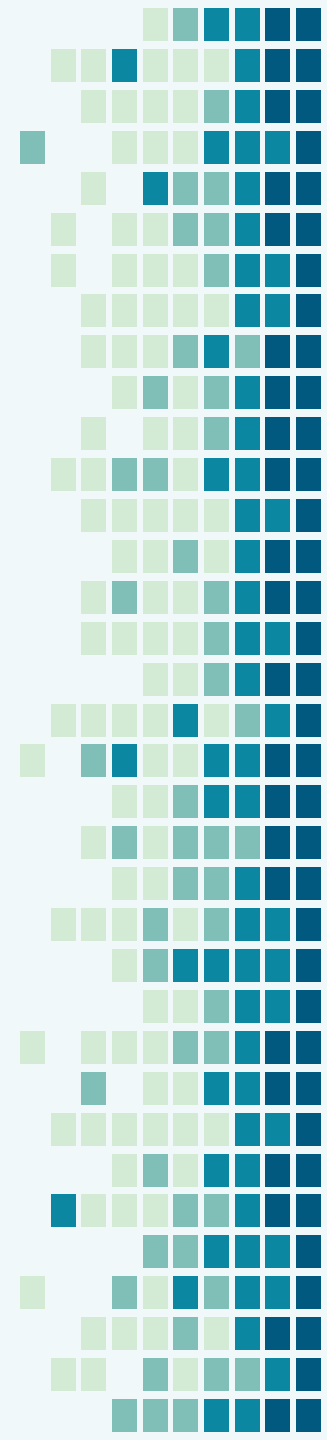
PRIMARY OUTCOMES

3. 6 MIN WALK DISTANCE (m)

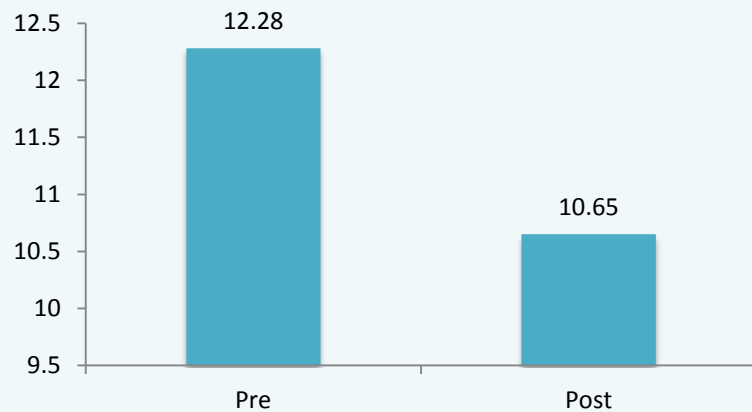
- Distance walked over 6 minutes
- **Measures:**
 - Aerobic capacity & endurance
- **Interpretation:**
 - 400-700m = Normal
 - 54m improvement is “clinically significant”

4. 6 MIN WALK GAIT VELOCITY (m/s)

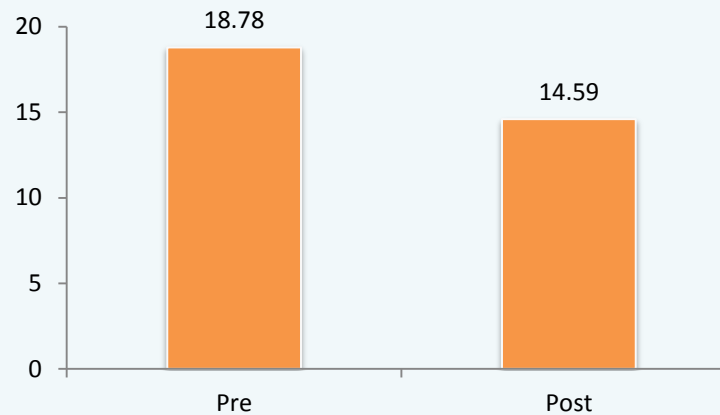
- Based on above



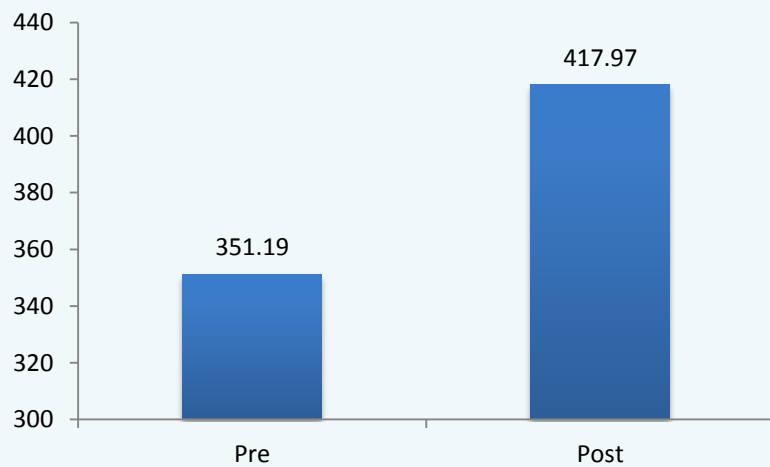
Timed Up & Go



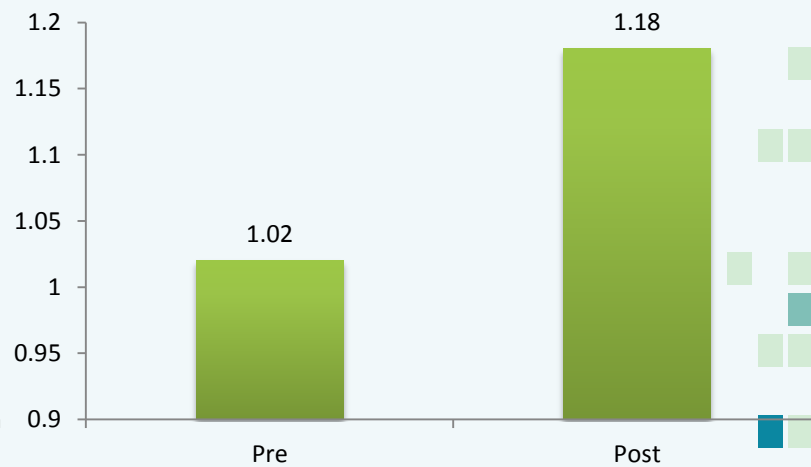
Sit to Stand



6 Min Walk Distance



6 Min Walk Gait Velocity



RESULTS

Outcome	Mean Improvement	p value	Confidence Interval (95%)
Timed Up & Go	1.63 secs	$p < 0.0001$	0.81 - 2.46
Sit to Stand (x5)	4.19 secs	$p < 0.00005$	2.58 – 5.81
6 Min Walk Distance	66.78 m	$p < 0.00005$	55.26 – 78.30
6 Min Walk Gait Velocity	0.151 m/s	$p < 0.00005$	0.18 – 0.12

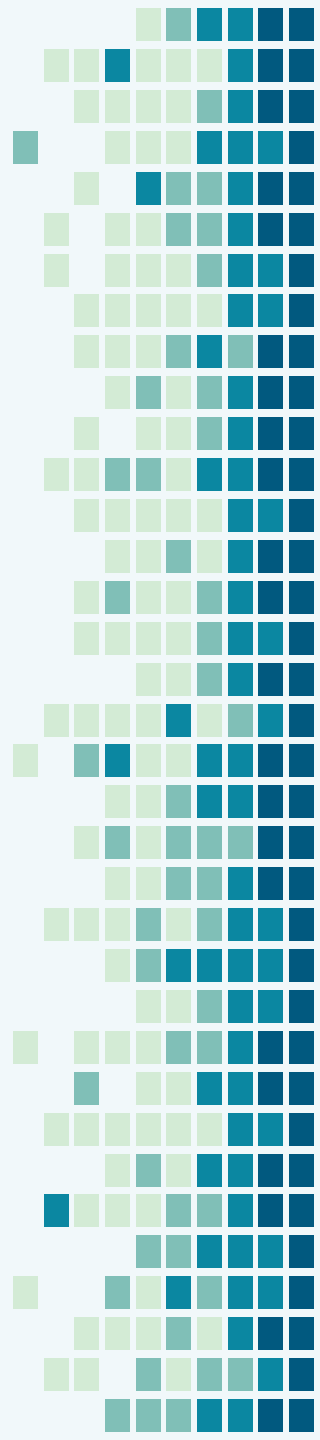
SIGNIFICANCE OF RESULTS

- 6 weeks of outpatient multidisciplinary rehab **statistically significantly improved all motor outcomes** (TUG, STS, 6MWD, 6MWV)
- ↑ Mobility/gait, balance, lower extremity strength & endurance
- ↓ Falls risk (TUG highly correlated)



CLINICAL SIGNIFICANCE

- **↑ 6MWD** 67m (>54m “clinically significant”)
- **↓ TUG** 1.63sec
↑ 1 sec in TUG = ↑ 5.4% odds of falling
- **STS (x5)** 14.59s (from 18.78s)
 - Cutoff time for recurrent fallers = 15 secs
 - Meta-analysis proposed times for different ages
 - 60-69: 11.4s, 70-79: 12.6s, 80-89: 14.8s
- **Gait speed** 1.18m/s (↑ from 1.02m/s)
 - Mean **gait speed** in PD = 0.94m/s (0.18-1.21)
 - Gait speed for healthy people in 60's = 1.30-1.36
 - 70% of PD patients with speed 0.88m/s = community walkers



Functional Improvement Related to Enrolment in Parkinson's Disease Rehabilitation Program

poster presentation

Association of Academic Physiatrists - Physiatry '18
Atlanta, Georgia
February 13-17, 2018

- **Beverly Chow**
- Basia Gwardjan
- David Ceglie
- Scott Harris
- Assunta Berardocco
- Florin Feloiu
- Shanker Nesathurai

The Outpatient PD Rehabilitation team:

- **Sandy Robinson** – Advance Practice Nurse
- **Assunta Berardocco**, PT, Senior Physiotherapist
- **Andrea Ingrahm**, RSW - Social Worker
- **Winnie Tam**, OTRegON, Occupational Therapist
- **Deneize Puri**, RD - Dietitian
- **Lindsay Brunton**, SLP-CASLPO - Speech Language Pathologist

- The Outpatient PD Rehabilitation program at Hotel Dieu Shaver is funded by:

The Steve Ludzik Foundation

- Pictures and info from:
 - www.emedicine.com
 - Internet
 - Bev Chow's presentation

Thank you!