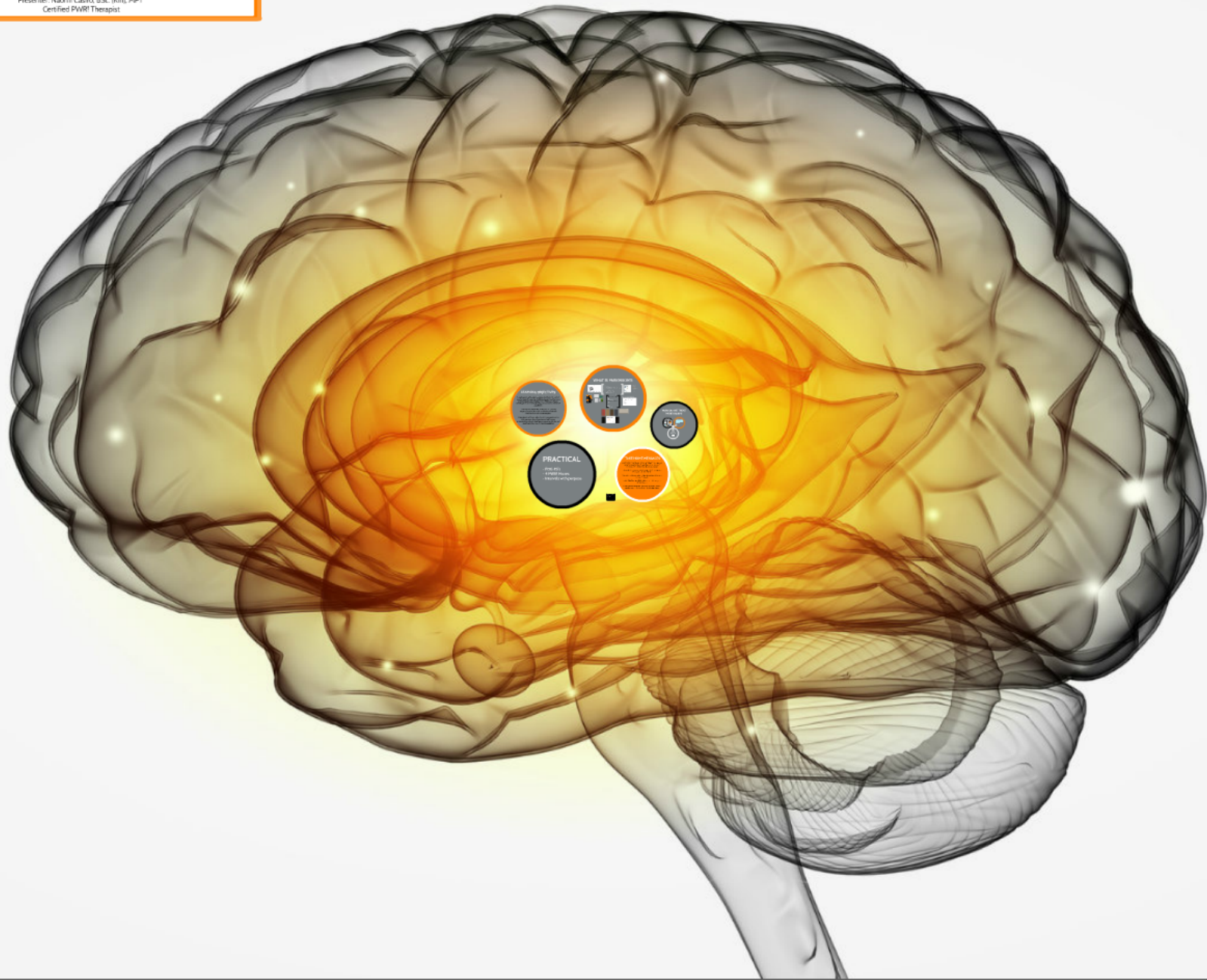


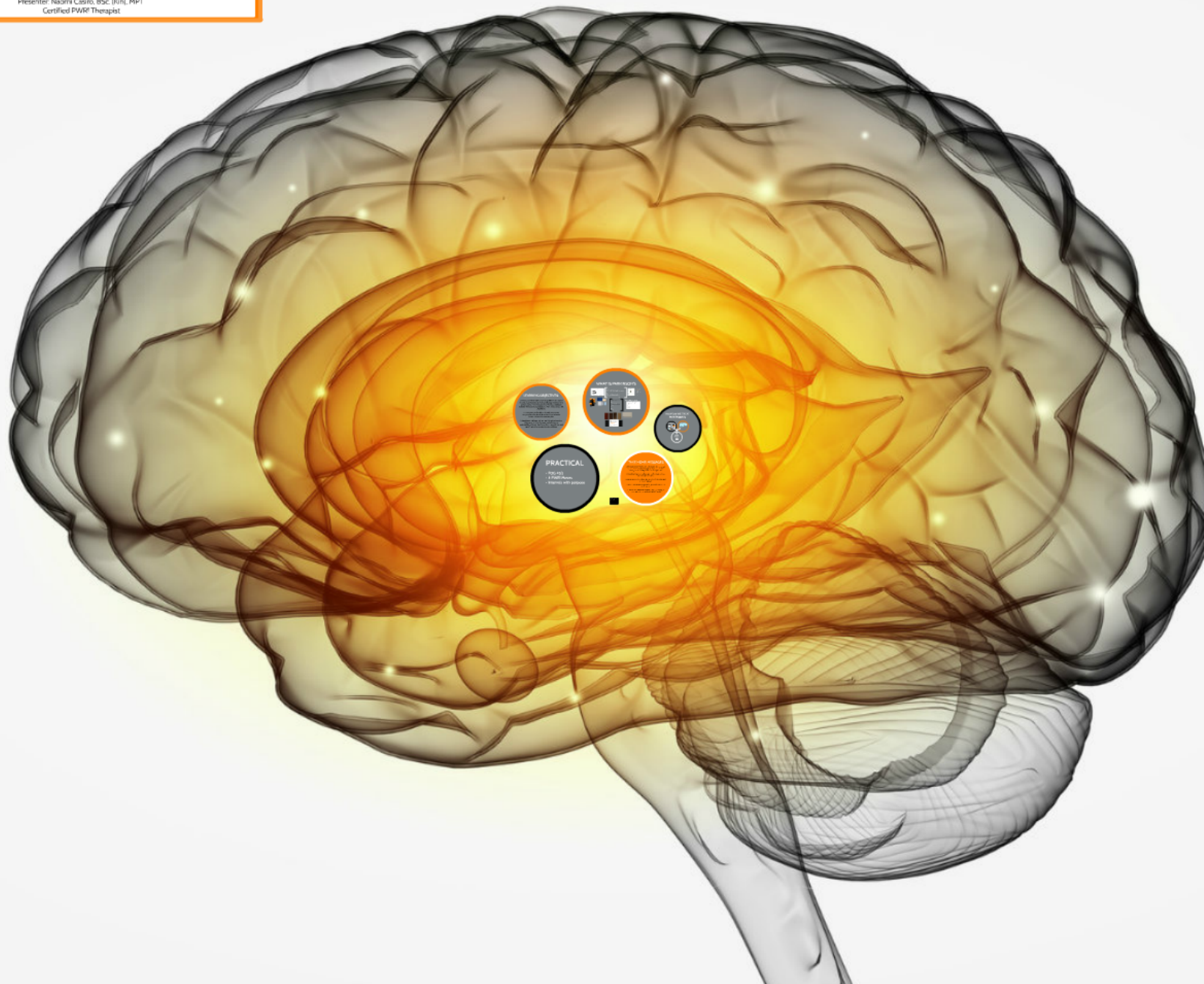
**CHANGING PARKINSON'S:
PHYSIOTHERAPIST-LED EXERCISE AS A
PRIMARY TREATMENT**

Presenter: Naomi Casiro, BSc (Kin), MPT
Certified PWR! Therapist



**CHANGING PARKINSON'S:
PHYSIOTHERAPIST-LED EXERCISE AS A
PRIMARY TREATMENT**

Presenter: Naomi Casiro, BSc (Hons), MPT
Certified PWRP Therapist



CHANGING PARKINSON'S: PHYSIOTHERAPIST-LED EXERCISE AS A PRIMARY TREATMENT

Presenter: Naomi Casiro, BSc. (Kin), MPT
Certified PWR! Therapist

LEARNING OBJECTIVES:

- 1. Participants will be able to explain and discuss the current research regarding exercise and physiotherapy treatment as a primary factor in the management of Parkinson's Disease including the basic neurophysiology of how exercise effects this population.*
- 2. Participants will be able to describe the primary components which should be included in an effective Parkinson's exercise treatment plan.*
- 3. Participants will leave with at least 3 functional exercises they can use in clinical practice and will have an understanding of how to build upon these using effective and specific principles relevant to this population*

WHAT IS PARKINSON'S

What is Parkinson's

- Progressive neurological disorder caused by gradual loss of cells in the Substantia Nigra area of the brain which is responsible for dopamine production and is the primary source of dopamine for the central nervous system.



"PD is now thought to be a multisystem disorder that involves not only the dopamine system, but other neuroanatomical systems whose role may become more prominent as the disease progresses" (Gallant et al. 2010)

INCIDENCE

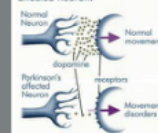
- Over 100,000 people with PD in Canada
- Second most common neurodegenerative disorder after Alzheimer's disease
- The number of Canadians over 40, living with Parkinson's disease, will increase by 65% by 2031
- The number of Canadians over 65, living with Parkinson's disease, will more than double by 2031

CAUSE

- Unknown
- "Genetics loads the gun, environment pulls the trigger"
- Increased risk - heavy metals, pesticides, male, older age
- Decreased risk - smoking, high uric acid, exercise mid life, anti-inflammatory meds, caffeine

-Rogging-Gemstone: An Understanding of Neurological Conditions in Canada

Dopamine levels in a normal and a Parkinson's affected neuron,



What does Dopamine do?

- movement
- memory
- pleasurable reward
- behavior and cognition
- attention
- sleep
- mood
- learning

What does it look like: Symptoms

TRAP



4 PRIMARY MOTOR SYMPTOMS

- Tremor
- Rigidity
- Bradykinesia
- Decreased Postural Control

OTHER MOTOR SYMPTOMS

- Gait Abnormalities
- Poor Posture
- FOG
- Falls
- Disc bulges
- Back pain
- Frozen shoulder
- UFT pain
- Feeling of generalized weakness

Non Motor Symptoms

Primary Symptoms (Non - Motor)

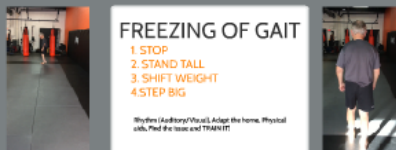
- Anxiety
- Sleep: REM sleep (dreams) and sleep (REM sleep)
- Sleep: Atrial fibrillation - inability to suppress movement - not Parkinson's, but etc.
- Smell
- Constipation
- Speech
- Bladder
- Cooperation issues
- GI issues
- Autonomic dysfunction
- Depression/Anxiety



FREEZING OF GAIT

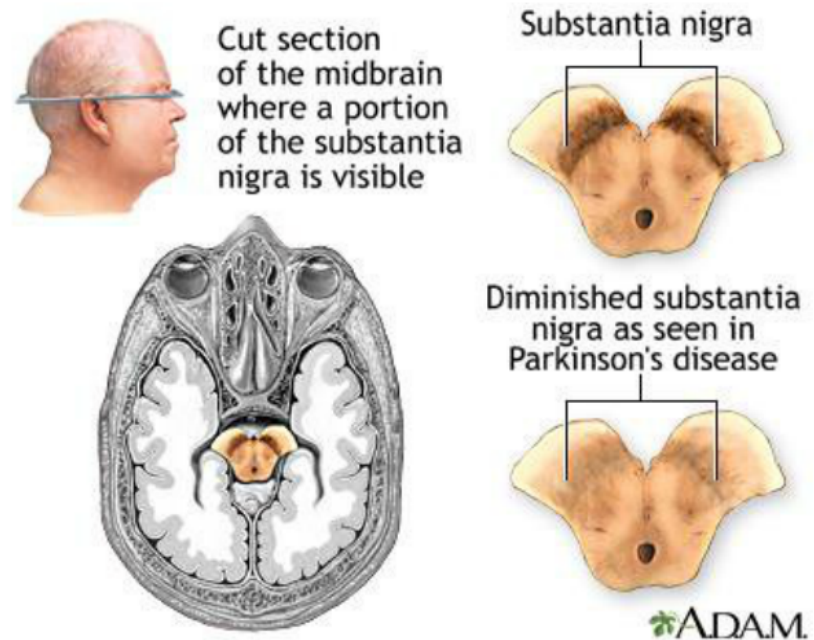
1. STOP
2. STAND TALL
3. SHIFT WEIGHT
4. STEP BIG

Rhythm (Auditory/Visual), Adjust the home, Physical aids, Feet the toes and THIGH IT



What is Parkinson's

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*"PD is now thought to be a **multisystem** disorder that involves not only the dopaminergic system, but other neurotransmitter systems whose role may become more prominent as the disease progresses"*
(Earhart et. al, 2013)

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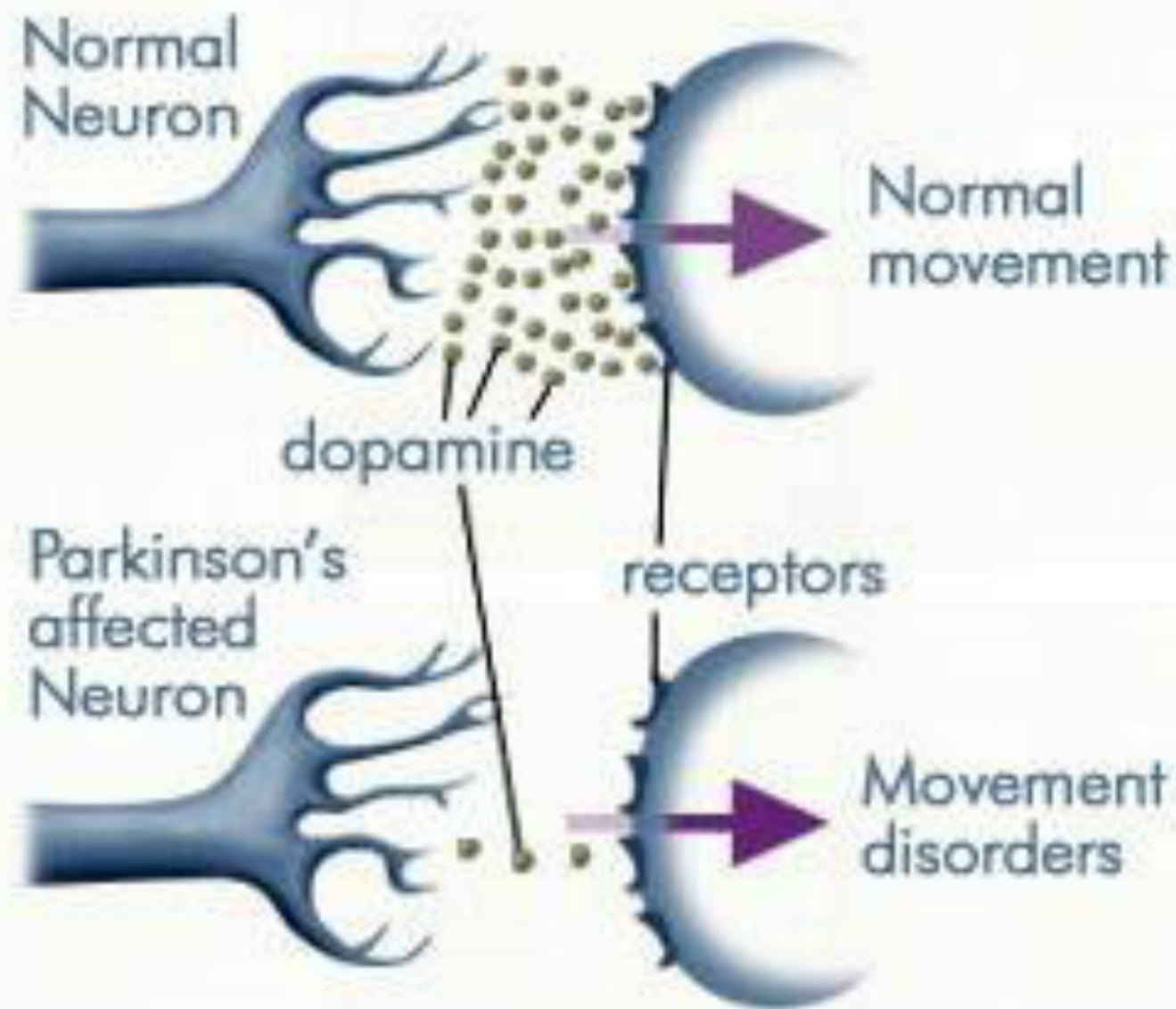
- Unknown
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- Increased risk - heavy metals, pesticides, male, older age
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- Mapping Connections: An Understanding of Neurological Conditions in Canada.

4 PRIMARY MOTOR SYMPTOMS

No

Dopamine levels in a normal and a Parkinson's affected neuron.

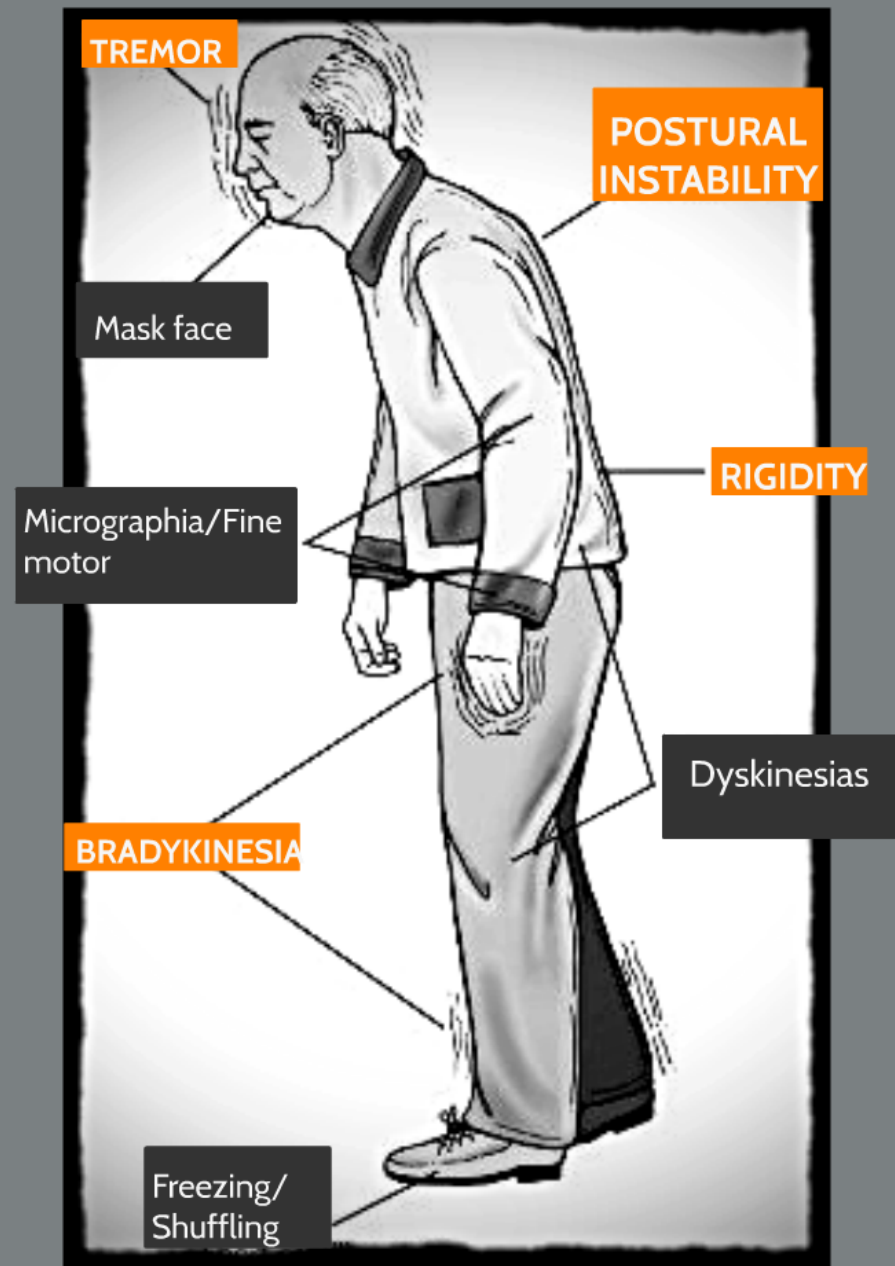


What does Dopamine do?

- *movement*
- memory
- pleasurable reward
- behavior and cognition
- attention
- sleep
- mood
- learning

What does it look like: Symptoms

T.R.A.P













4 PRIMARY MOTOR SYMPTOMS

Tremor

Rigidity

Bradykinesia

Decreased Postural Control

OTHER MOTOR SYMPTOMS

Gait Abnormalities

Poor Posture

FOG

Falls

Disc bulges

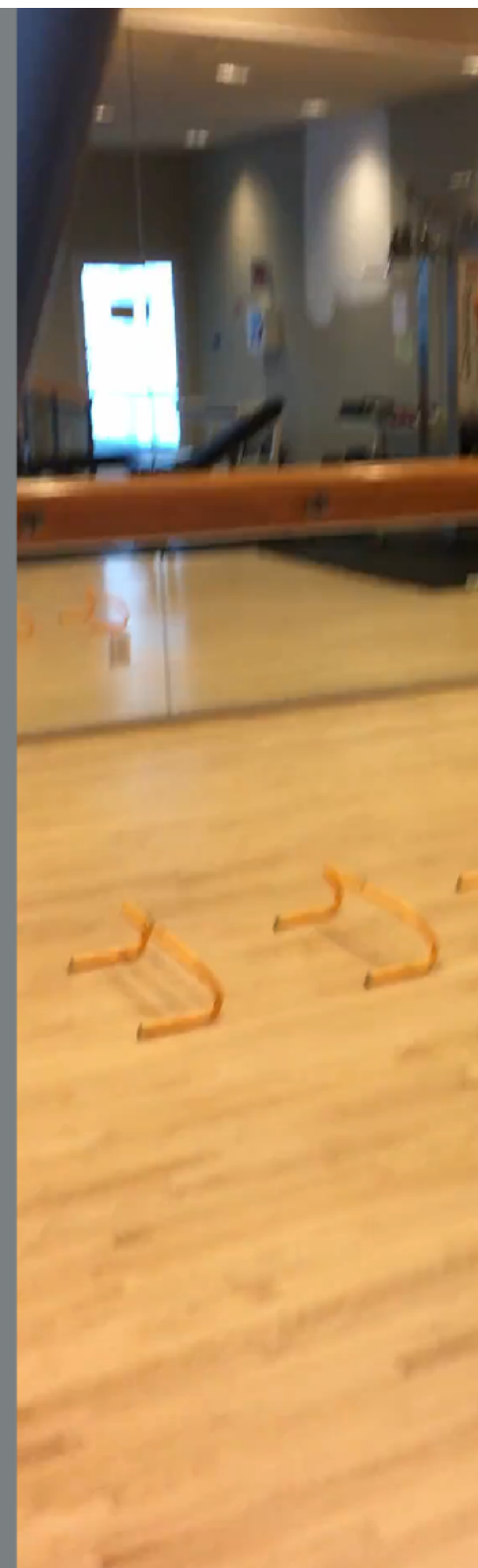
Back pain

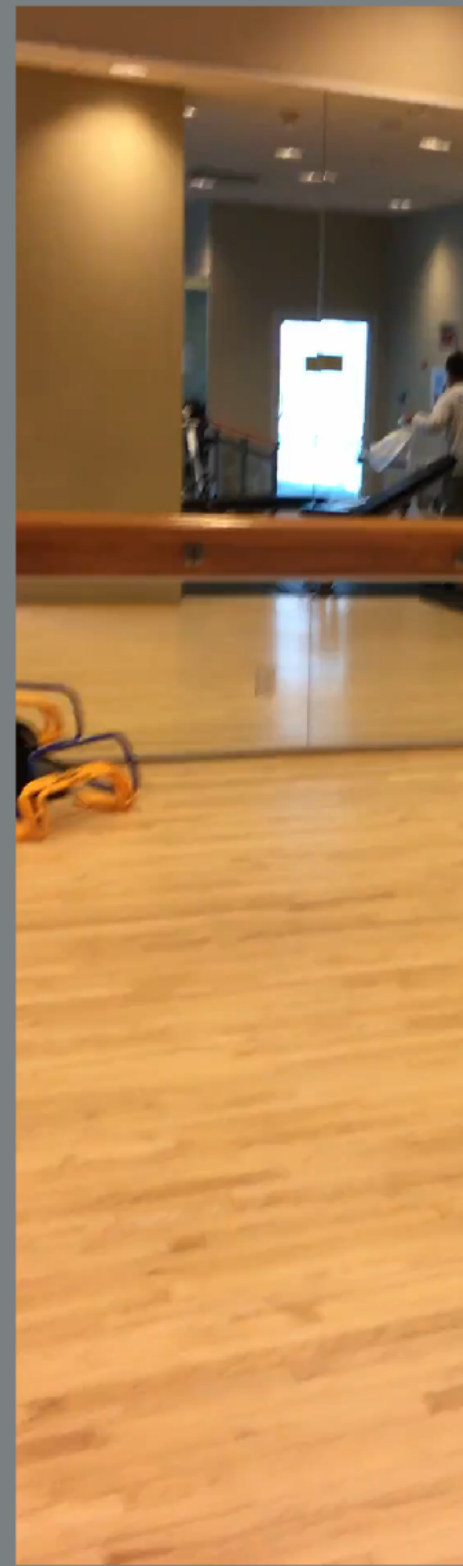
Frozen shoulder

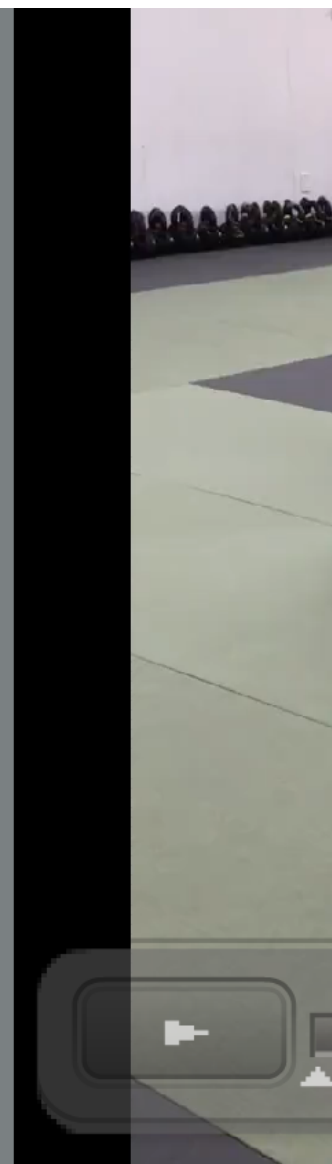
UFT pain

Feeling of generalized weakness











August 2018





FR

1. S

2. S

3. S

4.S

Rhyth
aids,

FREEZING OF GAIT

1. STOP
2. STAND TALL
3. SHIFT WEIGHT
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Rhythm (Auditory/Visual), Adapt the home, Physical aids, Find the issue and TRAIN IT!

GAIT

Physical

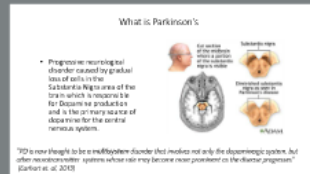


Non Motor Symptoms

Primary Symptoms (Non - Motor)

- Anxiety
- Speech/drooling (Mixed motor/non motor)
- Sleep -REM Disorder – inability to suppress movement – act out dreams, Hit etc..
- Smell
- **Fatigue**
- **Speech**
- **Pain** (40-85%)
- Cognitive issues
- GI issues
- **Autonomic Dysfunction**
- **Depression/Apathy**

WHAT IS PARKINSON'S

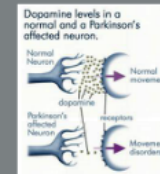


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Non Motor Symptoms

Primary Symptoms (Non - Motor)

- Anxiety
- Sleep Disturbance (related to motor symptoms)
- Sleep, Arousal Disorder - inability to suppress movement - not Parkinson's, but etc.
- Smell
- Fatigue
- Speech
- Pain
- Cognitive Issues
- Depression
- Depression
- Depression

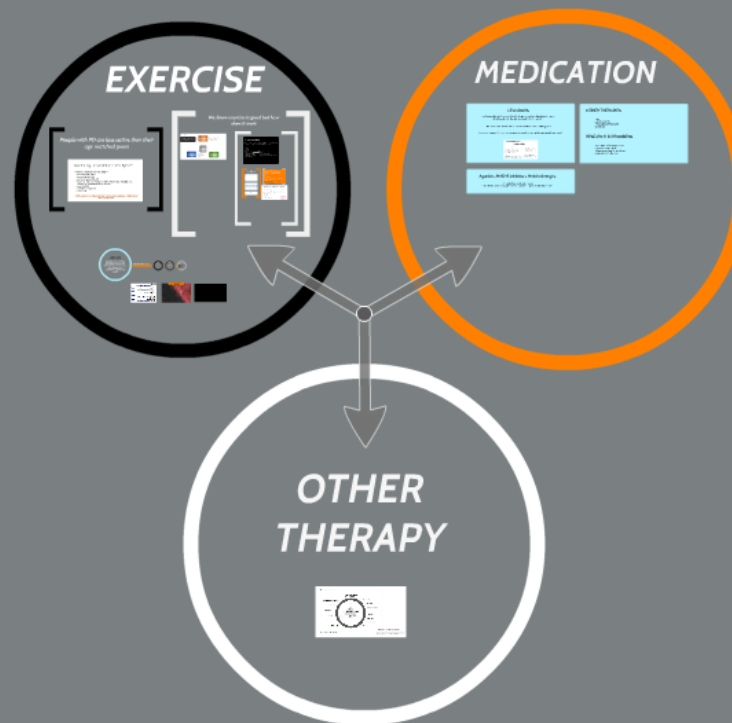


FREEZING OF GAIT

1. STOP
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Walter Skarzynski/Visual, Adapt the home, Physical with, Physical and THERAPY

HOW DO WE TREAT PARKINSON'S



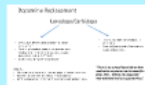
MEDICATION

LEVODOPA

Use began in the late 1960's and it is still the primary and is to this day still the most effective option for the pharmacological treatment of PD.

"NO DRUGS ARE PROVEN TO SLOW PD PROGRESSION" - AHslog, 2011

In order to engage effectively in vigorous exercise medication must be appropriately optimized!



OTHER THERAPIES

- DBS
- PROLOPA PUMP
- FOCUSED ULTRASOUND
- CANNABIS

RESEARCH IN PROGRESS

- Neurotrophic factor replacement
- Stem cell transplantation
- Subcutaneous medication delivery
- Supplements & other aids

Agonists, MAO-B inhibitors, Anticholinergics

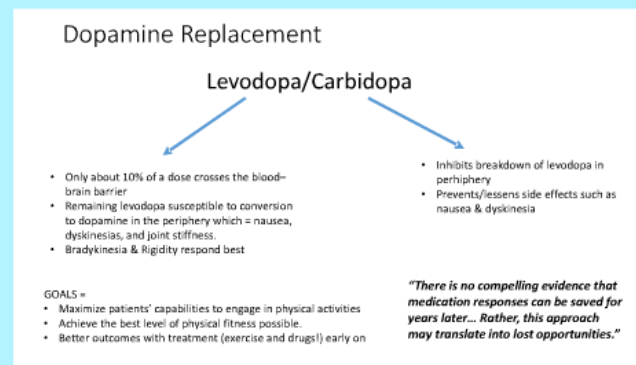
- Pre LDOFA or as adjunct therapy
- Side effects can be very significant (hallucinations, impulse control disorders etc...)

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Dopamine Replacement

Levodopa/Carbidopa

- 
- Only about 10% of a dose crosses the blood–brain barrier
 - Remaining levodopa susceptible to conversion to dopamine in the periphery which = nausea, dyskinesias, and joint stiffness.
 - Bradykinesia & Rigidity respond best

GOALS =

- Maximize patients' capabilities to engage in physical activities
- Achieve the best level of physical fitness possible.
- Better outcomes with treatment (exercise and drugs!) early on

- Inhibits breakdown of levodopa in periphery
- Prevents/lessens side effects such as nausea & dyskinesia

“There is no compelling evidence that medication responses can be saved for years later... Rather, this approach may translate into lost opportunities.”

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OTHER THERAPY

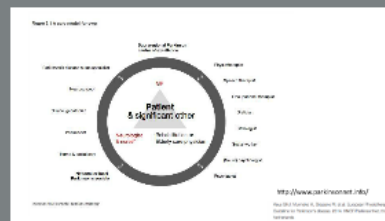
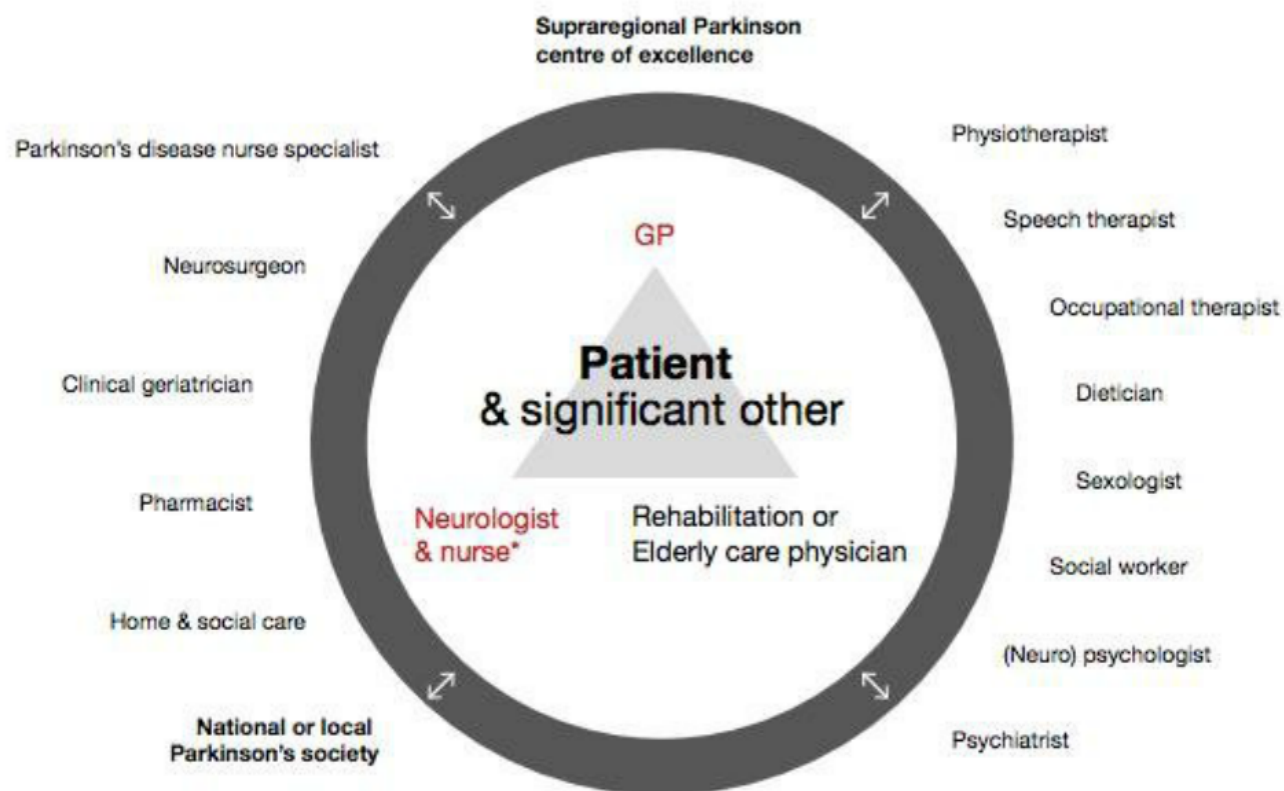


Figure 3.1 A care model for pwp



*in most situations the care coordinator

<http://www.parkinsonnet.info/>

Kaus SHJ, Munneke M, Graziano M, et al. European Physiotherapy Guideline for Parkinson's disease. 2014; KNGF/ParkinsonNet, the Netherlands

EXERCISE

People with PD are less active than their age matched peers

Take the regular benefits and amplify them

- Exercise & Physical fitness in seniors »
 - Better cognitive scores
 - Better vascular health
 - Better cardiovascular health
 - Decreased incidence of diabetes mellitus, hypertension, hyperlipidemia, obesity, and osteoporosis, falls and fracture
 - Longer survival
 - Anti-inflammatory effect
 - ...And more!

All this occurs in PD » improved motor and non-motor symptoms & mitigation of disease progression

We know exercise is good but how does it work



TAKE HOME:

EXERCISE HELPS MANAGE MOTOR AND NON-MOTOR SYMPTOMS, AND HELPS PEOPLE WITH PARKINSON'S FUNCTIONING BETTER FOR LONGER



People with PD are less active than their age matched peers

Take the regular benefits and amplify them

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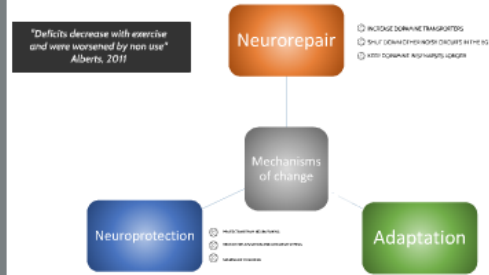
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Exercise is good but how does it work

Animal Models



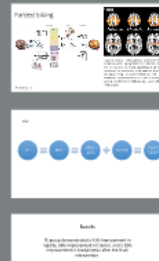
Human Models

LOTS OF RESEARCH SUPPORTING THE POSITIVE EFFECTS OF EXERCISE ON BOTH MOTOR AND NON MOTOR SYMPTOMS OF PD

- Dance
- Yoga
- Boxing
- Tai Chi
- Aerobic training
- Amplitude training
- High Intensity Training
- BWSTT
- Strength Training

Available Online: Evidence for a Direct Effect to Slow Parkinson Disease Progression
Alz Dis 2016; 31(6)
 Hum Clin Neuropharmacol, Volume 33, Issue 5, 360-372

Study Highlights



BOXING SPECIFIC RESEARCH

BOXING SPECIFIC RESEARCH
 "...immediate and long-term improvements
 in balance, mobility, endurance, and quality of
 life."
 Combs et al., 2011

"the boxing group demonstrated significant improvements in gait velocity and endurance over time"
Combs et al. 2013

- These changes may have been due to the whole body approach inherent to boxing training

THE ABC STUDY – HOME VS. PT VS. GROUP

Treatment: "The program targets basic postural systems in a 'boot camp' model to target biomechanical efficiency, kinesthesia, limits of stability, anticipatory postural adjustments, balance/force, and coordination during gait."

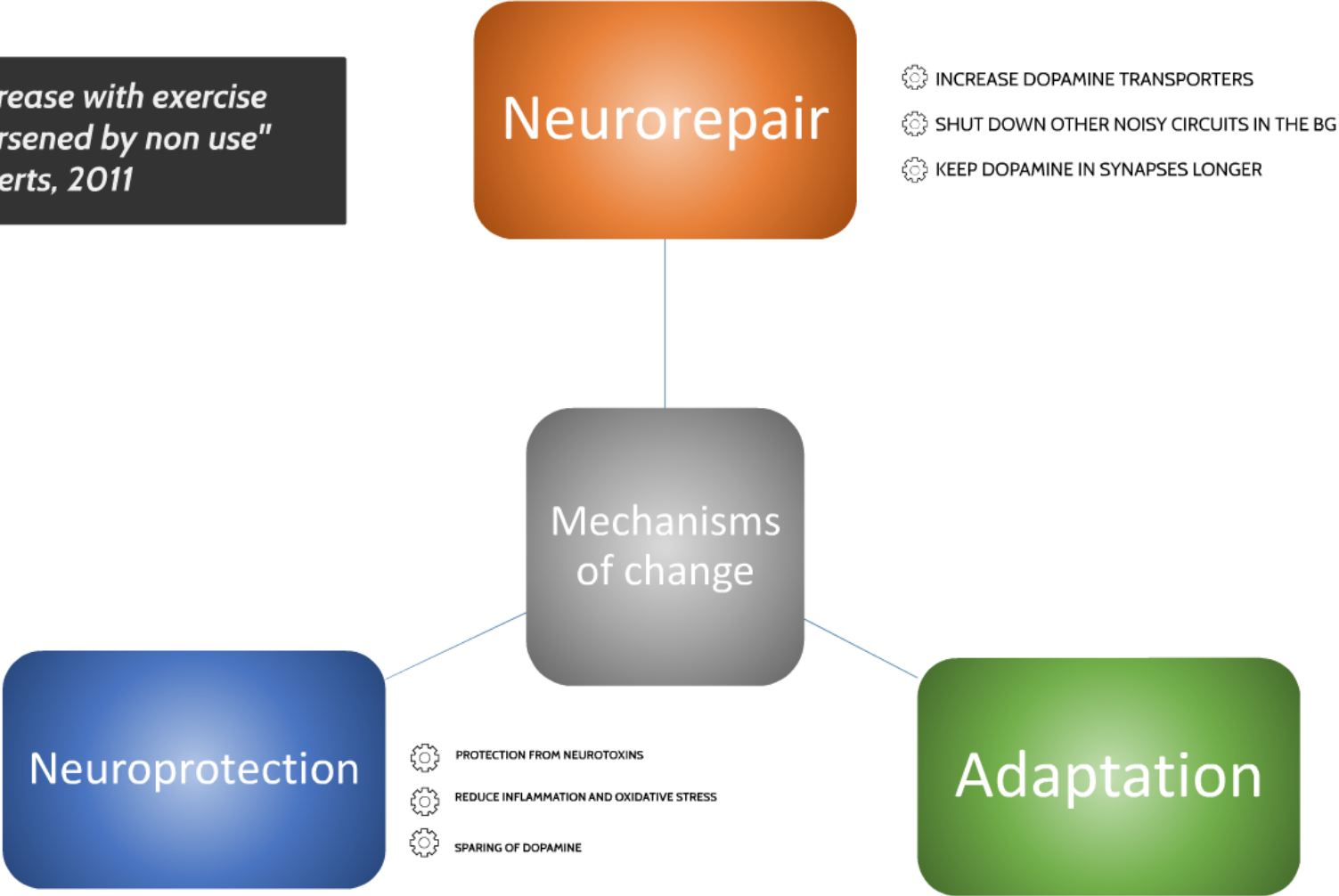
Set age 6 students: Tai chi, Sealing, Jangos, Kwikong, Agil's course and Pilates. Each activity was systematically progressed for 3 levels by

- [1] challenging sensory integration via alteration of visual and surface conditions,
- [2] restricting availability of external cues,
- [3] increasing speed
- [4] increasing resistance
- [5] adding secondary tasks.

Timeline: 13 weeks for 4 weeks with 60-minute sessions and no intervention

Animal Models

*"Deficits decrease with exercise
and were worsened by non use"*
Alberts, 2011




Animal Models

***"Deficits decrease with exercise
and were worsened by non use"
Alberts, 2011***

Human Models

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- Tai Chi
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- **Amplitude training**
- **High Intensity Training**
- BWSTT
- Strength Training

Aerobic Exercise: Evidence for a Direct Brain Effect to Slow Parkinson Disease Progression

Ahlskog, J. Eric

Mayo Clinic Proceedings , Volume 93 , Issue 3 , 360 - 372

"...extensive and diverse avenues of scientific investigation converge to argue that aerobic exercise and cardiovascular fitness directly influence cerebral mechanisms mediating PD progression.



Aerobic Exercise: Evidence for a Direct Brain Effect to Slow Parkinson Disease Progression

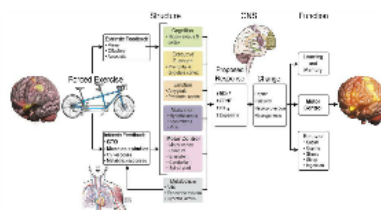
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Study Highlights

Forced biking



(Alberts et al.)

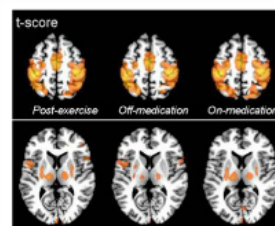


Figure 1. Cortical and subcortical activation maps across subjects. Highlighted areas indicate areas in the brain where increased blood flow, or cortical activation is present with hand movement tasks during scanning. The pattern of cortical and subcortical activation was similar while patients were on medication and following FE while off medications.

HOW?



Results

FE group demonstrated a 41% improvement in rigidity, 38% improvement in tremor, and a 28% improvement in bradykinesia after the 8-wk intervention.

BOXING SPECIFIC
"...immediate and long-term improvements in balance, mobility and quality of life."

Combs et.al., 2011

"the boxing group demonstrated significant improvements in balance and endurance over the 8-week period."
Combs et. al., 2013

- These changes may approach inherent to aging.

THE ABC STUDY

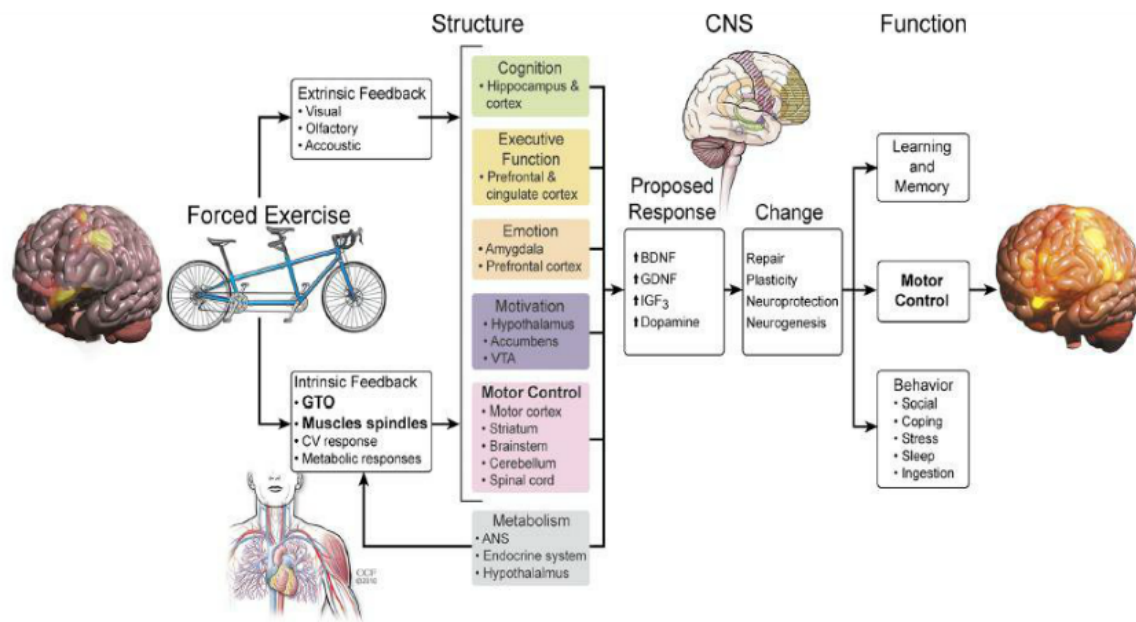
Treatment: "The program targets biomechanical constraints, kinesthetic awareness, and coordination during bradykinesia, and coordination during bradykinesia."

Set up: 6 stations: Tai chi, Boxing, Tai chi, Boxing, Tai chi, Boxing, systematically progressed for 3 levels.

- (1) challenging sensory integration
- (2) restricting availability of external feedback
- (3) increasing speed
- (4) increasing resistance
- (5) adding secondary tasks.

Timeline: 8 weeks for 4 months

Forced biking



(Alberts et al.)

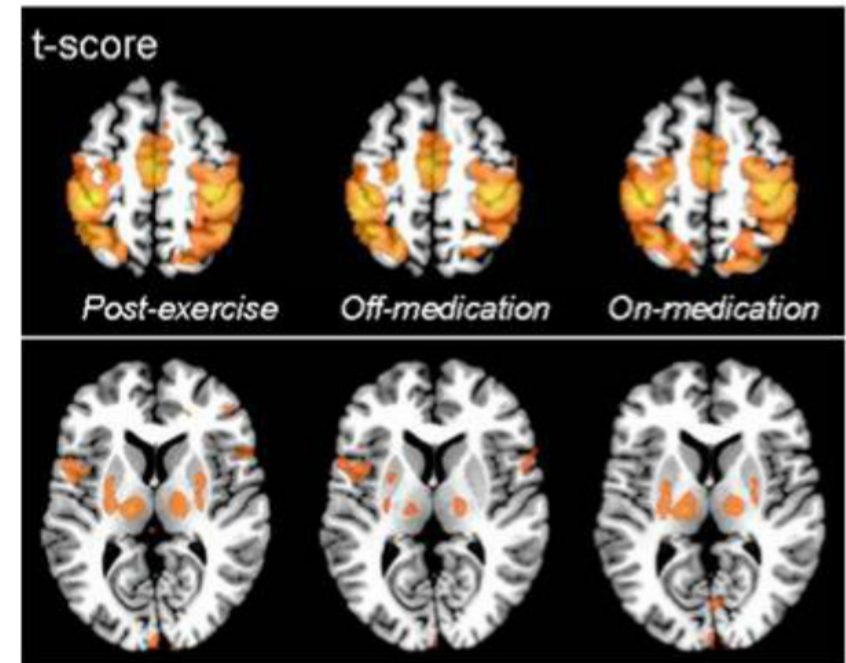
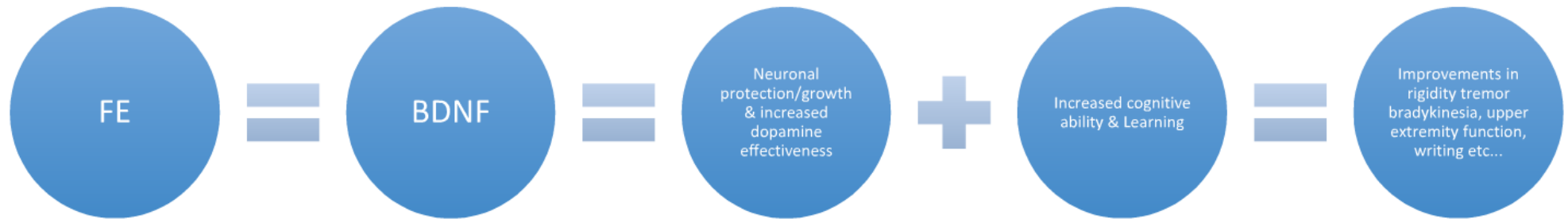


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- (1) challenging sensory integration via alteration of visual and surface conditions,
- (2) restricting availability of external cues
- (3) increasing speed
- (4) increasing resistance
- (5) adding secondary tasks.

Timeline: 3X/week for 4 weeks with 60 minute sessions exercise intervention

Results:
HEP showed the
least improvement
across all measures

Results:

**HEP showed the
least improvement
across all measures**

TAKE HOME:

***EXERCISE HELPS MANAGE
MOTOR AND NON MOTOR
SYMPTOMS AND KEEPS PEOPLE
WITH PARKINSON'S
FUNCTIONING BETTER FOR
LONGER***

EXERC

EXERCISE PRESCRIPTION



F.I.T.T

FREQUENCY:
30-60 mins 5+ days of the week

INTENSITY:
Moderate to Vigorous physical activity

TIME:
30-60 mins

TYPE:
Aerobic activity

- + Functional movement training 2-3 days/wk!
- + Resistance training 2-3 days/wk
- + Flexibility/Balance training 2 days/wk

****THINK ABOUT HOW TO INCORPORATE IT ALL INTO
YOUR PROGRAM**

PRINCIPLES

**OVERLOAD
SPECIFICITY**

**USE IT OR LOSE IT
(ON STEROIDS)**

WHAT SHOULD YOUR EXERCISE BASED PD TREATMENT PLAN FOCUS ON?

- ✓ Goal directed high amplitude movement
- ✓ Increasing speed of movement
- ✓ Reducing rigidity/Increasing movement capacity (e.g. trunk rotation)
- ✓ Optimizing postural alignment & control for balance & function
- ✓ Gait training
- ✓ Weight shifting and "anti freeze" techniques
- ✓ Patterning & repetition
- ✓ Challenging cognition
- ✓ Falls Prevention (dual task, reactive control etc...)
- ✓ Functional movements (Stepping, Skipping, Rolling)
- ✓ EDUCATION

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- ✓• Functional movements (Stepping, Skipping, Rolling)
- ✓• EDUCATION

ANY Position

PWR!Moves™ at a Glance

PWR!Up

Posture



PWR!Rock

Weight Shift



PWR!Twist

Trunk Rotation



PWR!Step

Transition



Low Floor | Prone

Low Floor | Supine

High Floor | All 4's

Sitting

Standing

JOIN THE EXERCISE REVOLUTION!





NEUROFIT BC

Exercise For Brain Change

People with Parkinson's Fighting for life!

LEARNING OBJECTIVES:

- 1. Participants will be able to explain and discuss movement patterns, posture and the importance of Parkinson's disease in the management of Parkinson's disease.
- 2. Participants will be able to discuss the importance of posture and the importance of posture in the management of Parkinson's disease.
- 3. Participants will be able to discuss the importance of posture and the importance of posture in the management of Parkinson's disease.

WHAT IS PARKINSON'S



A diagram of the human brain, specifically focusing on the basal ganglia. It shows the path of dopamine from the substantia nigra to the striatum, illustrating the role of dopamine in movement control.

HOW DO WE TREAT PARKINSON'S



A diagram of the human brain, specifically focusing on the basal ganglia. It shows the path of dopamine from the substantia nigra to the striatum, illustrating the role of dopamine in movement control.

PRACTICAL

- FOG 45y
- 4 PWR! Moves
- Intervals with purpose

TAKE HOME MESSAGES

- Parkinson's is a progressive neurodegenerative disease.
- The loss of dopamine-producing cells in the substantia nigra leads to the characteristic motor symptoms of Parkinson's disease.
- Treatment aims to manage symptoms and improve quality of life.
- Exercise, including physical therapy, can help manage symptoms and improve quality of life.

TAKE HOME MESSAGES

1. INTENSIVE, FUNCTIONAL, REGULAR EXERCISE is an integral part of treatment for the PD population both for symptom management and mitigation of disease progression
2. Intermittent (exercise specific) follow up with a knowledgeable health professional is a **MUST**.
3. Exercise must be fun and salient in order for clients to take part and stay motivated.
4. CHALLENGE YOUR CLIENTS. Hidden potential is everywhere with Parkinson's
5. WE ARE THE MOVEMENT EXPERTS, We need to educate ourselves and our clients and **KNOW OUR RESOURCES**

NAOMI CASIRO, BSc. (Kin), MPT,
Certified PWR! Therapist

info@neurofitbc.com
www.neurofitbc.com



NEUROFIT BC

Resilience in Motion

PRACTICAL

- FOG 4S's
- 4 PWR! Moves
- Intervals with purpose

**CHANGING PARKINSON'S:
PHYSIOTHERAPIST-LED EXERCISE AS A
PRIMARY TREATMENT**

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