SHAKING UP THE WORLD OF

PARKINSON'S DISEASE

THE ROLE OF CHIROPRACTIC NEUROLOGY

Ashkan Jalili, DC, DACNB, FACFN, FAAHP

BC-Licensed Chiropractic Physician
Associate Professor Clinical Neurology
Fellow American College of Functional Neurology
Diplomate American Board Chiropractic Neurology
Fellow American Board of Metabolic Medicine

Parkinson Society British Columbia

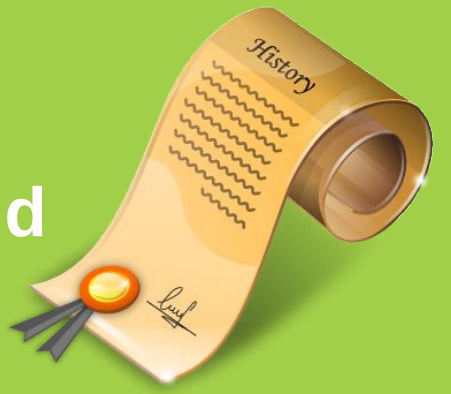
History of Functional Neurology

Pioneered by Dr. Fredrick R Carrick

- Quintuple board-certified Chiropractic Neurologist, researcher and educator
- Founder of the Carrick Institute for Graduate Studies
- Former Director of Functional Neurology for the Carrick Brain Centers in Dallas, TX & Atlanta, GA
- Has assembled the world's largest database of Dynamic Computerized Posturographic outcomes related to TBI, neurodegenerative disease and movement disorders assembled from thousands of patients across the globe

History of Functional Neurology

- Published in Gait & Posture, Disability & Rehabilitation
- Frontiers in Public Health, Biomedical Science Instrumentation
- Journal of Biomechanics, Current Pharmacological Design, Brain Injury
- Neurorehabilitation, Clinical Neurophysiology,
- Int'l Journal of Adolescent Medicine & Health,
- Journal of Alternative Medicine, Journal of Manipulative and Physiologic Therapeutics,
- Parkinsonism and related disorders,
- Mediterranean Journal of Physical and Rehabilitation Medicine
- Int'l journal of Disability and Human Development.



What is Chiropractic Neurology?

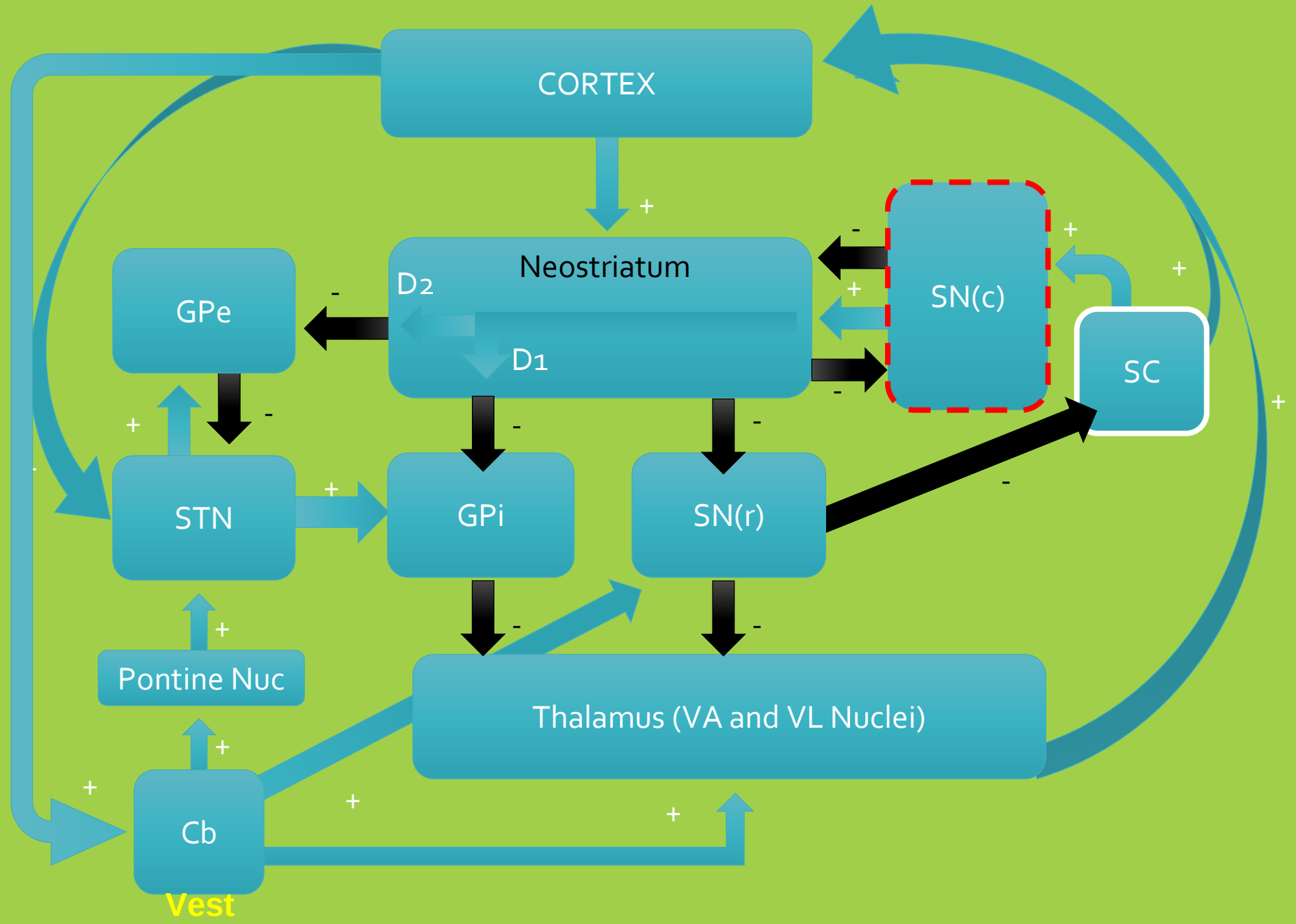
- Doctor of Chiropractic or the equivalent that has taken 300 post-doctoral hours of coursework in functional neurology

- Must pass a rigorous written & performance exams required for Board certification by the ACNB

- We call these doctors Diplomates of the American Chiropractic Neurology Board (DACNB)

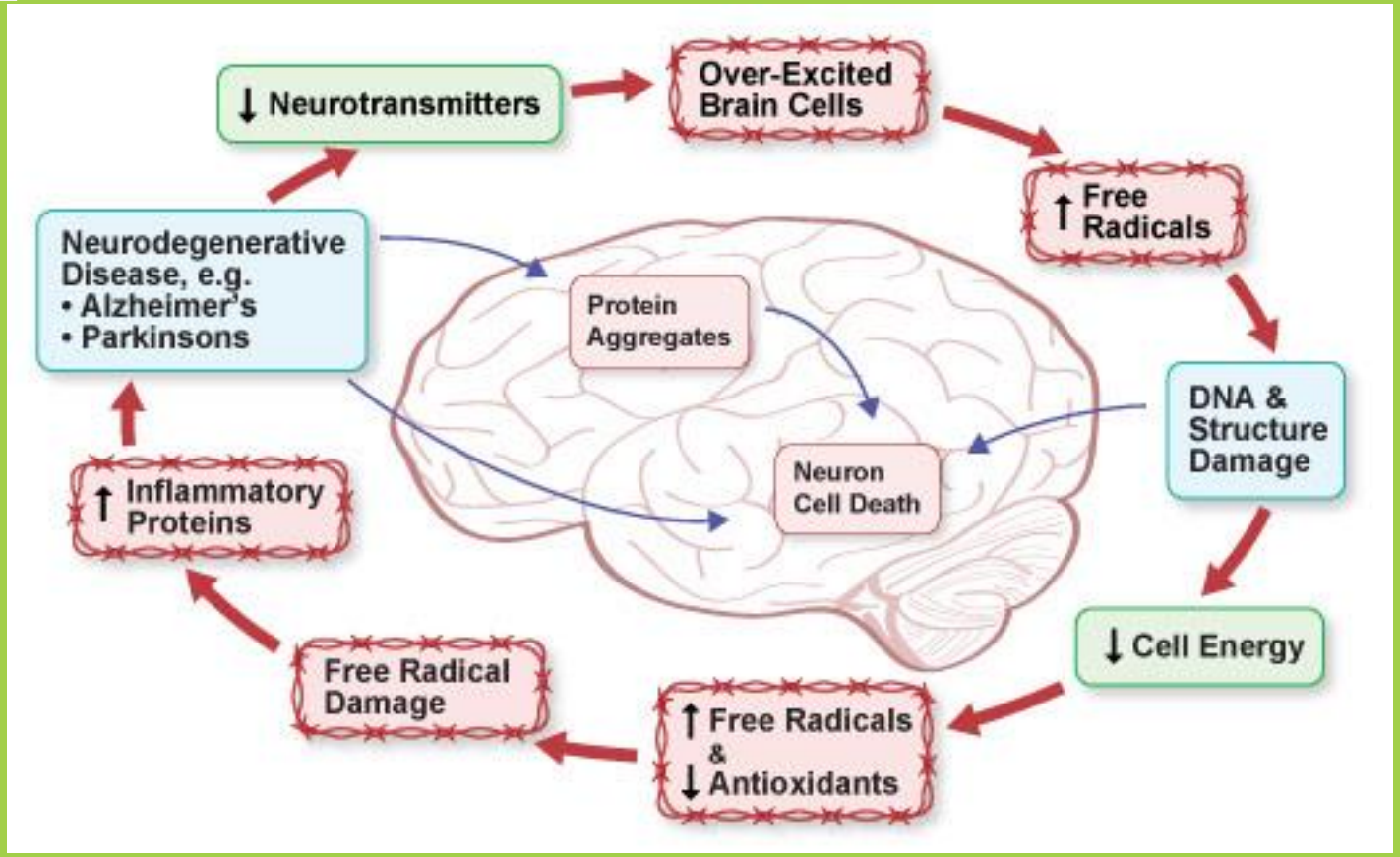
What is Chiropractic Neurology?

- We use the body and environment to assess the neuropathway weakness & dysfunctions.
- Examination & Assessment by a qualified Diplomate could take between 1 hour to 2 hours for certain conditions.


CORTEX
Neostriatum
D2
D1
GPe
STN
GPi
SN(c)
SN(r)
SC
Pontine Nuc
Thalamus (VA and VL Nuclei)
Cb
Vest
+
-

MECHANISM

- A-Synuclein
  - By-product of mitochondrial toxicity-induced cell death
- Lewy Body
  - An accumulation of a-synuclein
- A-synuclein has an affinity for certain types of tissues
- Braak’s staging



Chiropractic & Functional Neurology

Doctor of Chiropractic

Primary care trained in sport and spine injuries

Known for our effective techniques in joint manipulation

Also provide rehabilitation & clinical nutrition

Employ natural and conservative methods of care

Functional Neurology

A specialty in the chiropractic profession

Plus additional sub-specialties

3-4 years didactic and clinical training

Must become board certified

Trained in diagnosis & management of neurological disorders

Medical Neurologist vs Functional Neurologist?

We are trained to diagnose and manage neurological disorders

- Only differ in the methods of treatment

Offer non-surgical and drug-free methods of care

- Refer and co-manage care with medical specialists

Neurological rehabilitation with novel applications

Testing/Diagnosis

- **NO SINGLE WAY TO MAKE A POSITIVE DIAGNOSIS**
- No blood test
- Imaging does not show anything until very late
- **DaTscan** may be able to show dopamine uptake deficiency
- **UPDRS testing** is the most accurate definitive diagnosis tool
- Good neurological exam provides a window to brain integrity and potential for improvement

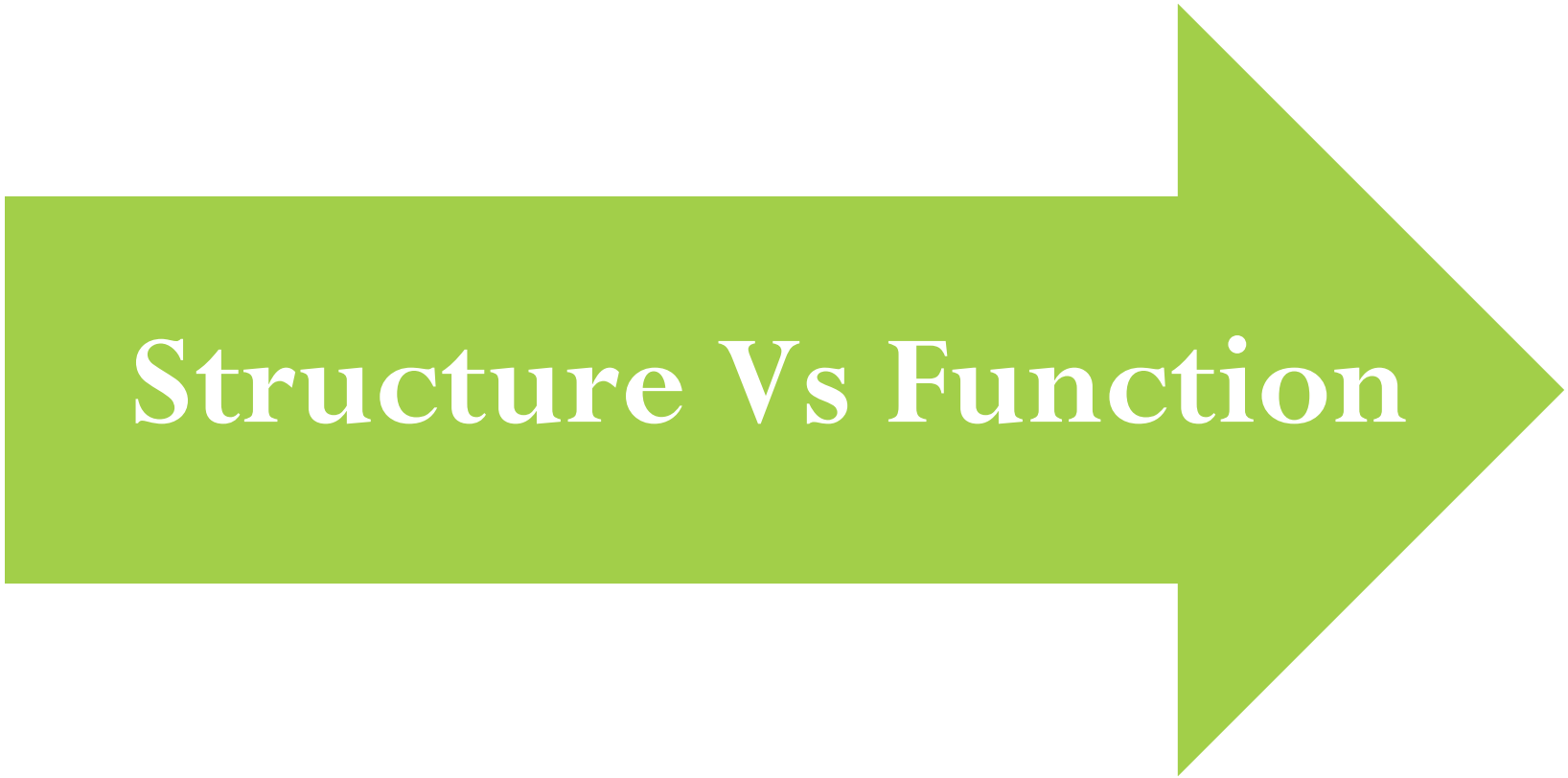
THE Examination

Comprehensive Medical History

Physical & Neurological Examination

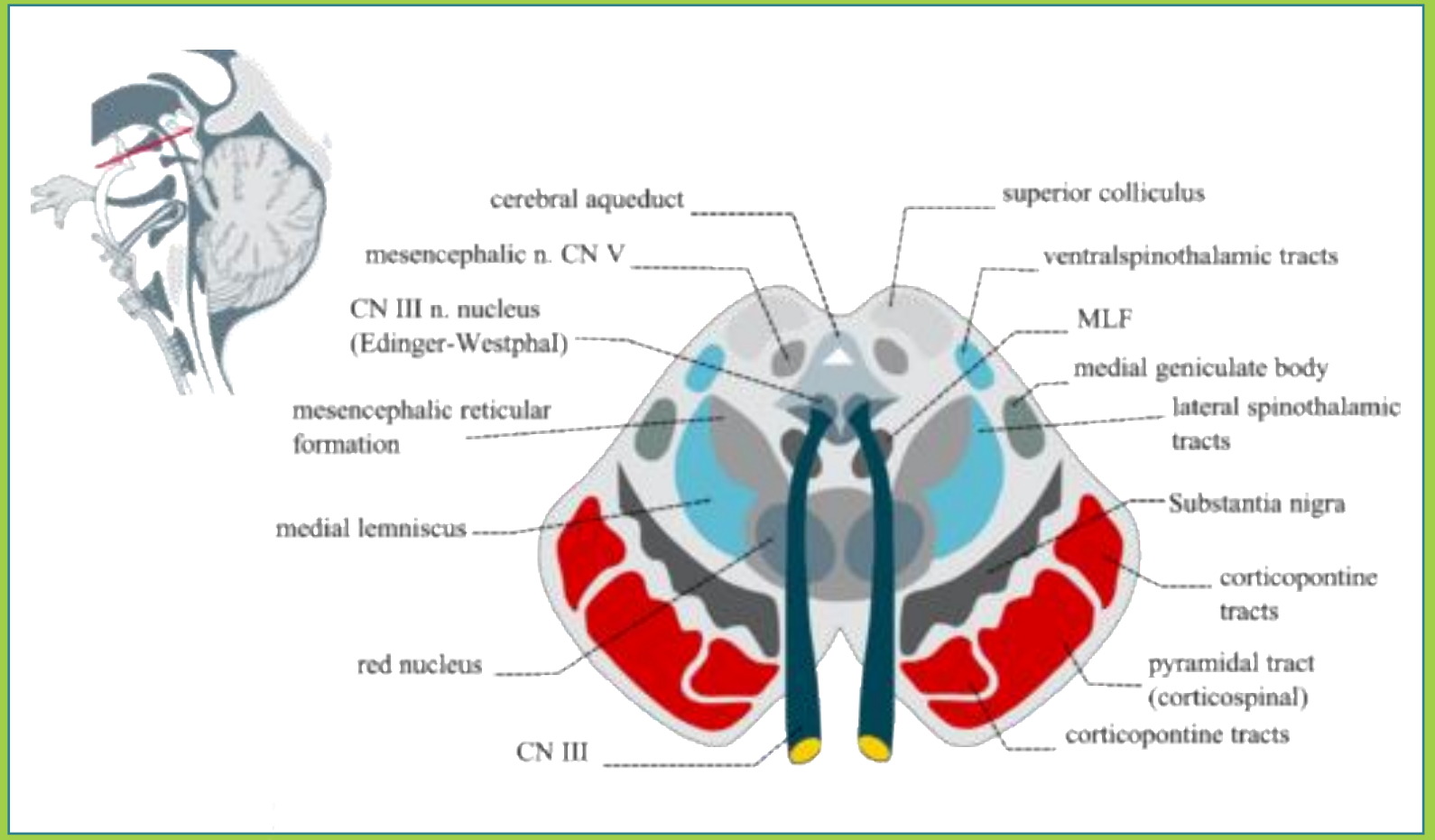
Special Tests

How do we test neurological dysfunctions in Parkinson's?



FUNCTIONAL ASSESSMENT

- Vitals
- Balance
- Vestibular Function
- Eye Tracking
- Saccades
- Coordination
- Cognitive Assessment
- Physical Examination
- UPDRS



Common Tests Used to Measure Function

- Vestibular Assessment
- Video Oculography
- Gait Analysis
- Postural Stability Assessment

Common Tests Used to Measure Function

- RightEye Brain Assessment
- Neuro-Cognitive Assessment
- Muscle Strength and Reflexes
- Spinal & Joint Alignments

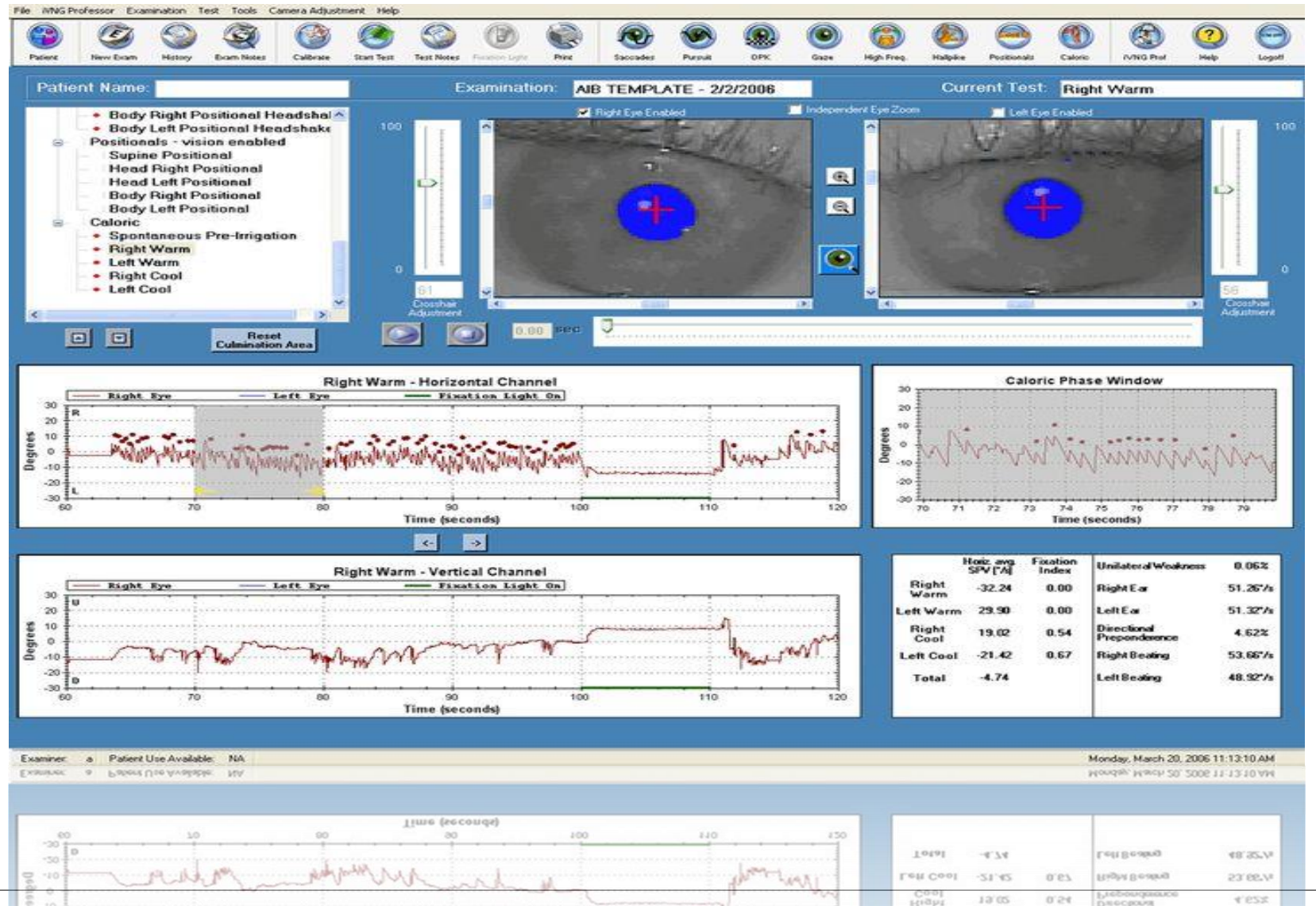
Goals of Examination

- Identify orthopedic musculoskeletal and peripheral nerve dysfunctions
- Test neurological systems independently and as integrated whole
- Objectively measure these functions

Video-Oculography

- Gold Standard for the evaluation of dizziness or balance disorder
- Objectively measures the reflexogenic and volitional visual systems controlling the eyes

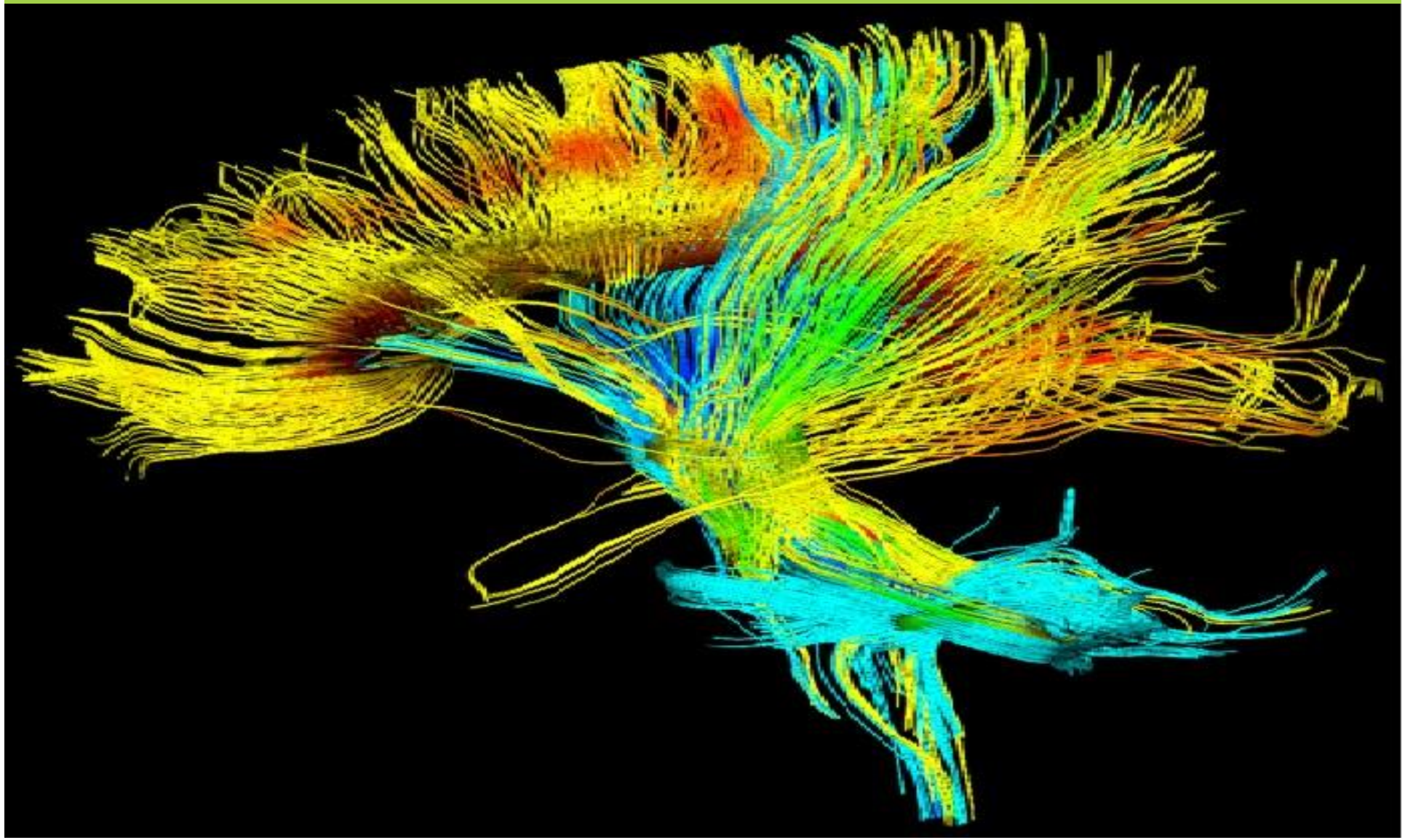
Video-Oculography



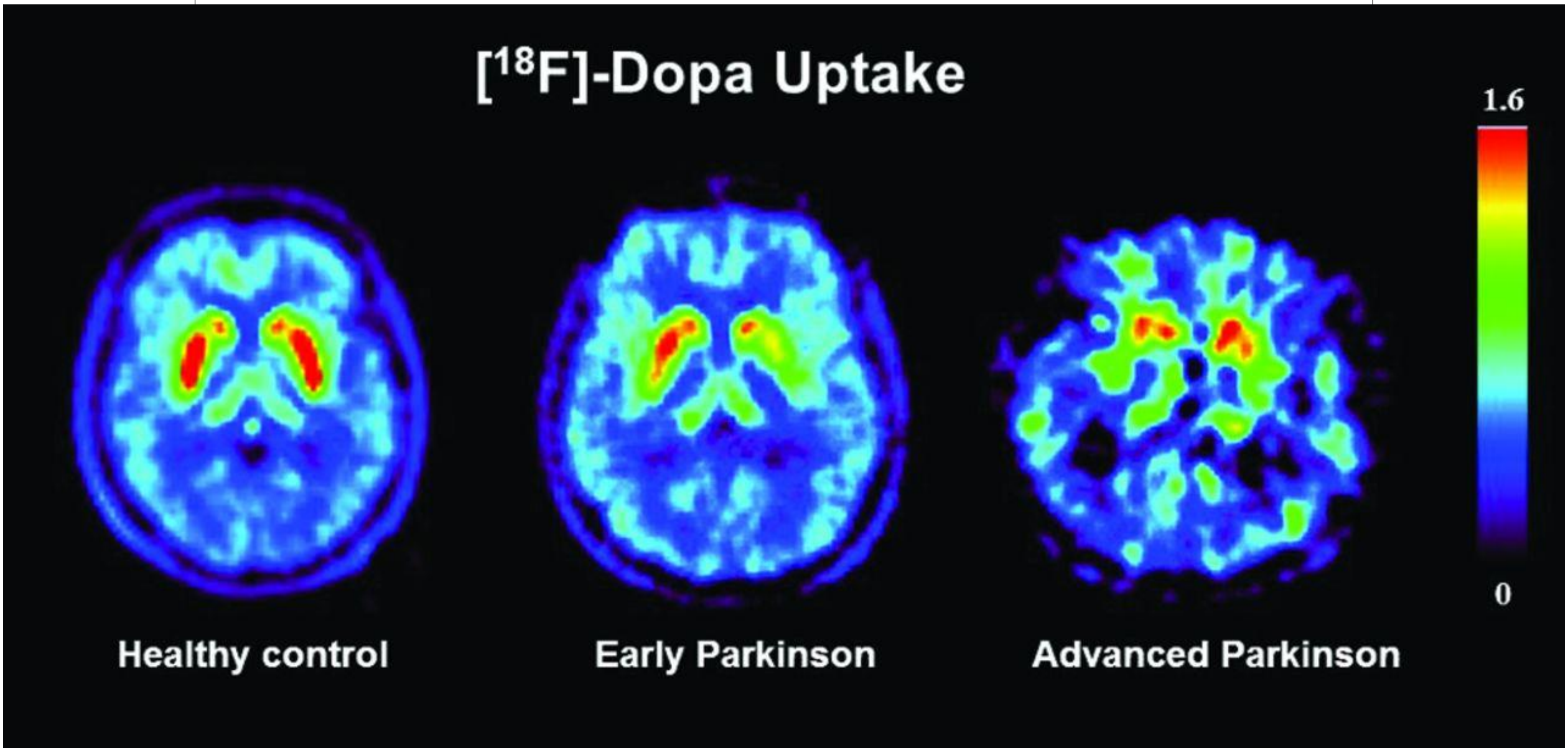
Common Medical Tests to Measure Function

- Functional MRI and Spectroscopy
- PET Scans
- Electroencephalograms
- Neuropsychological Testing

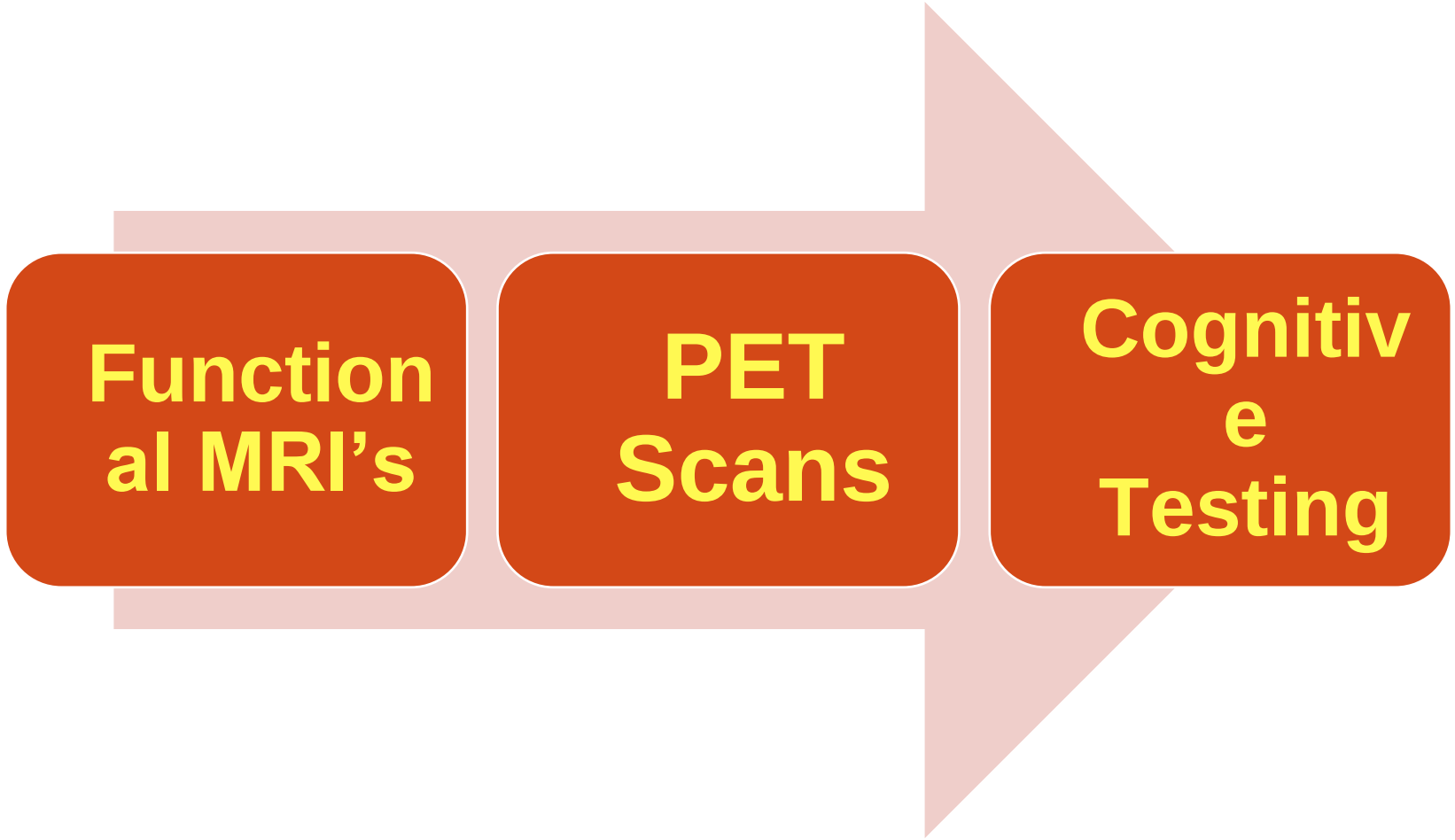
MRI Tractography



SPECT Scan


[18F]-Dopa Uptake
1.6
0
Healthy control
Early Parkinson
Advanced Parkinson

What are these tests missing?



They fail to test

How the brain responds to the environmental stimuli

Cannot Restore Function

TRADITIONAL TREATMENT

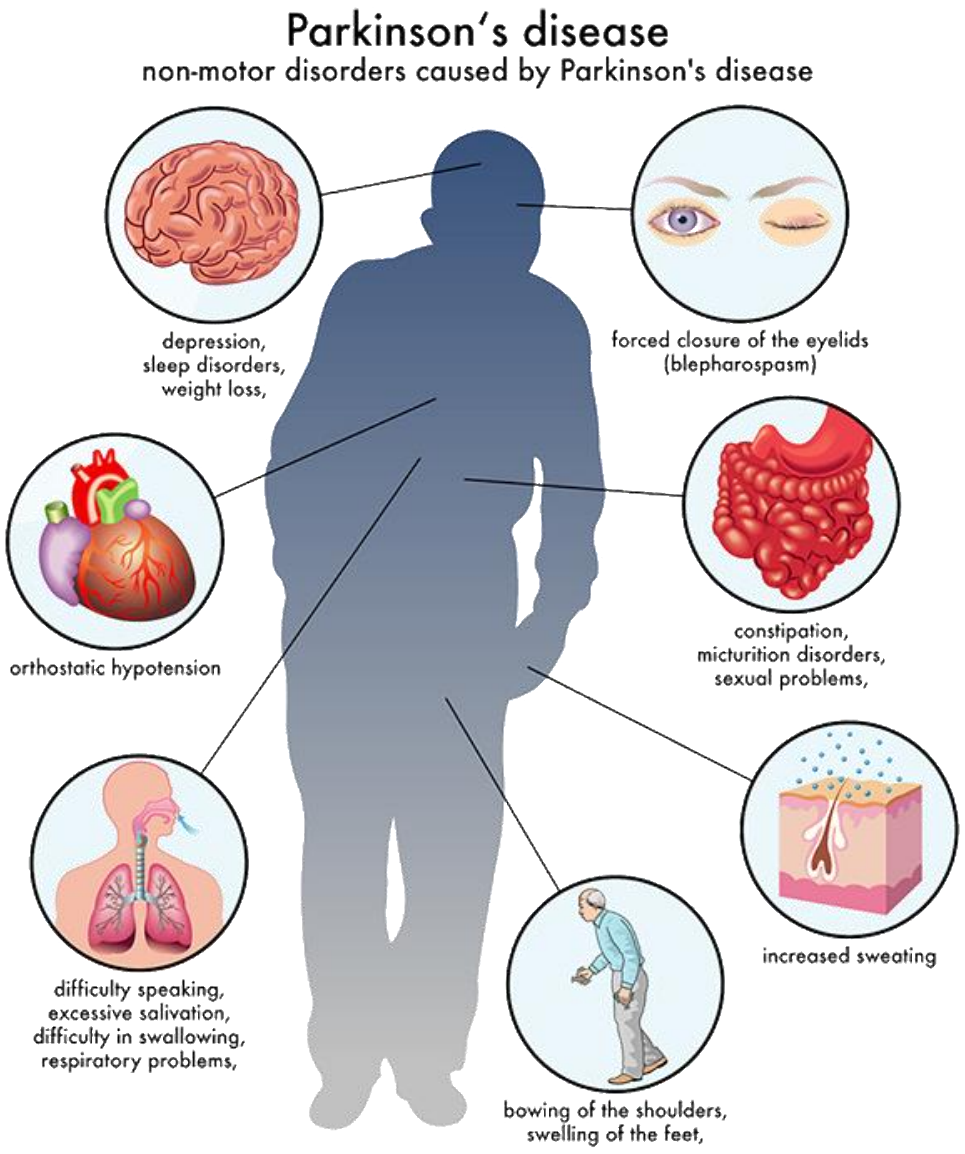
- Levadopa
  - Very effective at reducing tremor early, then effectiveness wears off
  - Side effects:
    - Dyskinesia
    - Nausea
    - Vomiting
    - Hallucinations
    - Paranoia
    - Hypotension
- Deep Brain Stimulation
- Pallidotomy
- Or…

EPIDEMIOLOGY

- #2 Most Common Neuro-degenerative Disorder
- Incidence: 20 per 100,000
- Estimated 6600 New Cases Per Year
- Annual cost of medical service per PD patient can reach over to $120,000
  - Falls
  - Tremor Suppression
  - Depression
  - Sleep disturbance
  - Bladder and sexual dysfunction

PRESENTATION

- Tremor
- Bradykinesia
- Akinesia (Rigidity)
- Constipation
- Anosmia
- Hypothymia
- Fatigue
- Hypotension
- Imbalance
- Restless Legs
- Depression
- Stooping Posture
- Decreased Taste
- Irritability
- Shuffling
- Freezing
- Blurred Vision
- Cognitive Decline



RISK FACTORS

- **Family History**
- **Toxins**
- **Trauma**
- **Smoking**
- Age (55+)
- Sex (M>F)
- HX of Depression
- Testosterone/Estrogen Balance
- Folate (B9) Deficiency

UPDRS QUICK TESTS – TRY THEM!

Grading 0-4 Scale

0- Perfect, 1- Slight, 2- Mild, 3- Moderate, 4- Severe

1. Finger Tap
2. Rapid Pronation and Supination
3. Standing from Chair

1. Posture
2. Pull Test
3. Gait Assessment

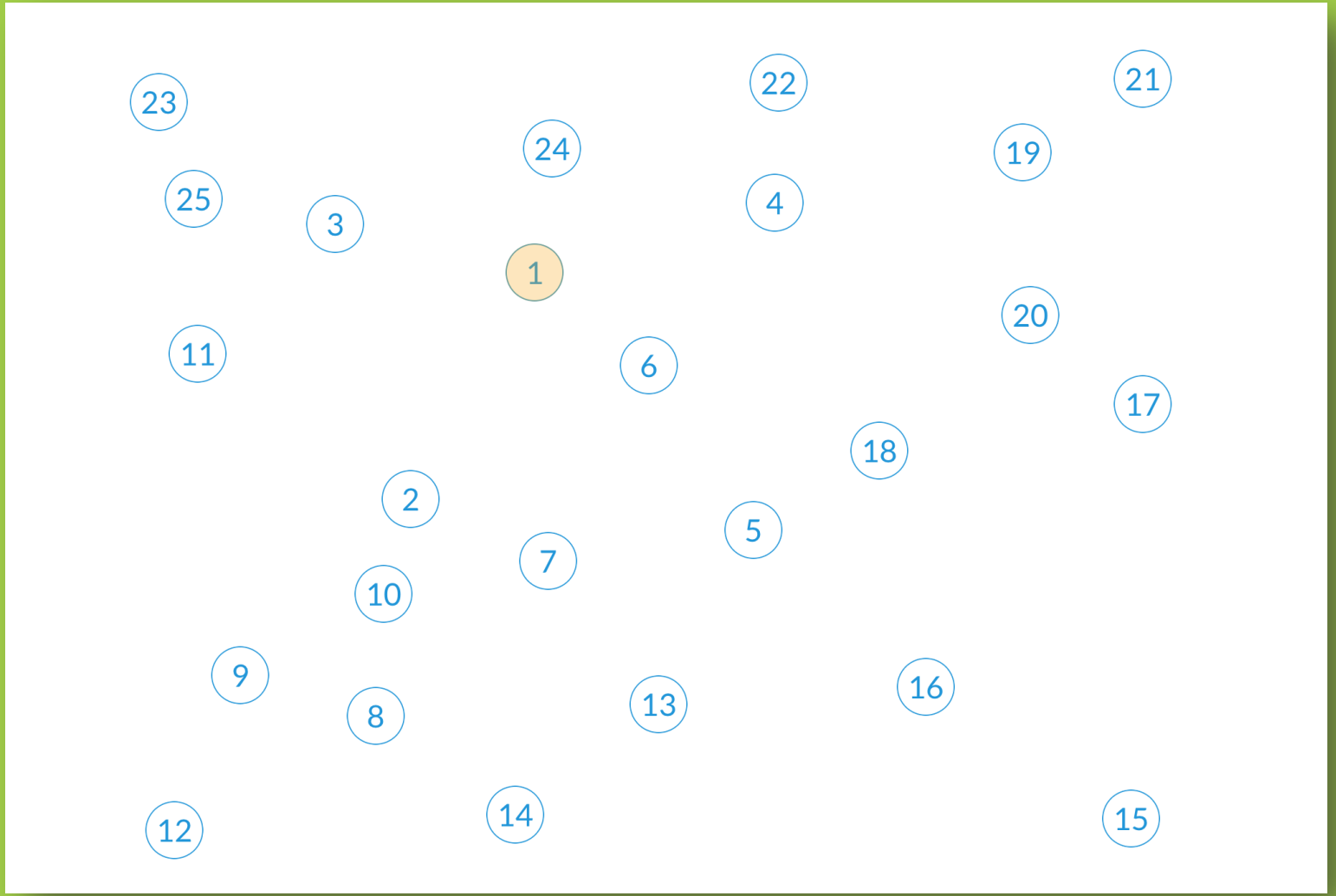
UPDRS – EARLY PARKINSONS

TRAILS MAKING TEST

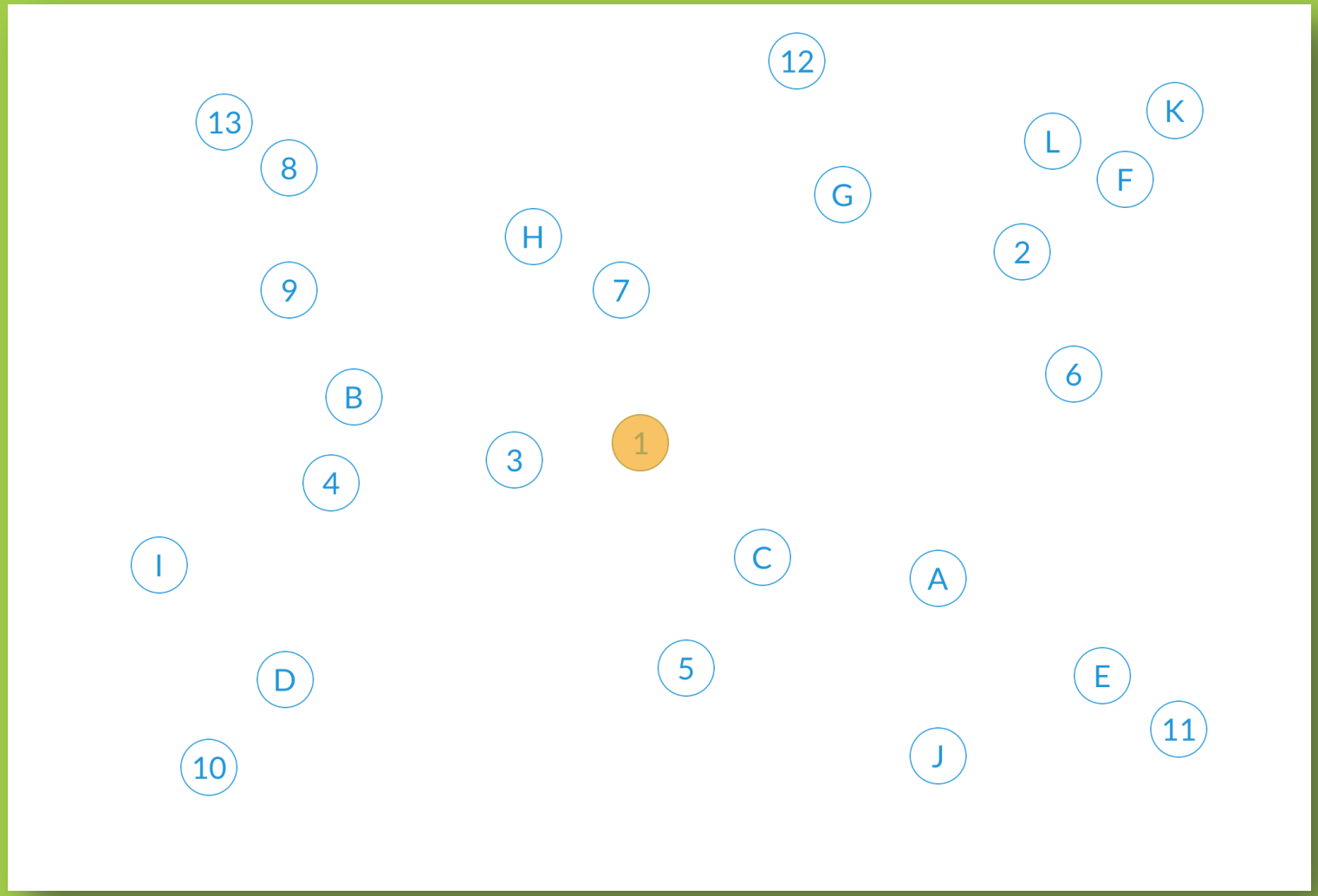
- Trails A:
  - **1-25** numbers randomly placed on a sheet of paper.
- Trails B:
  - **1-13** Numbers randomly placed PLUS **A-L** letters randomly placed
- Time Trails A, then Time Trails B

Higginson, C. I., Lanni, K., Sigvardt, K. a, & Disbrow, E. a. (2013). The contribution of trail making to the prediction of performance-based instrumental activities of daily living in Parkinson's disease without dementia. *Journal of Clinical and Experimental Neuropsychology*, *35*(5), 530–9. http://doi.org/10.1080/13803395.2013.798397

TRAILS A



TRAILS B



TRAIL MAKING TESTS

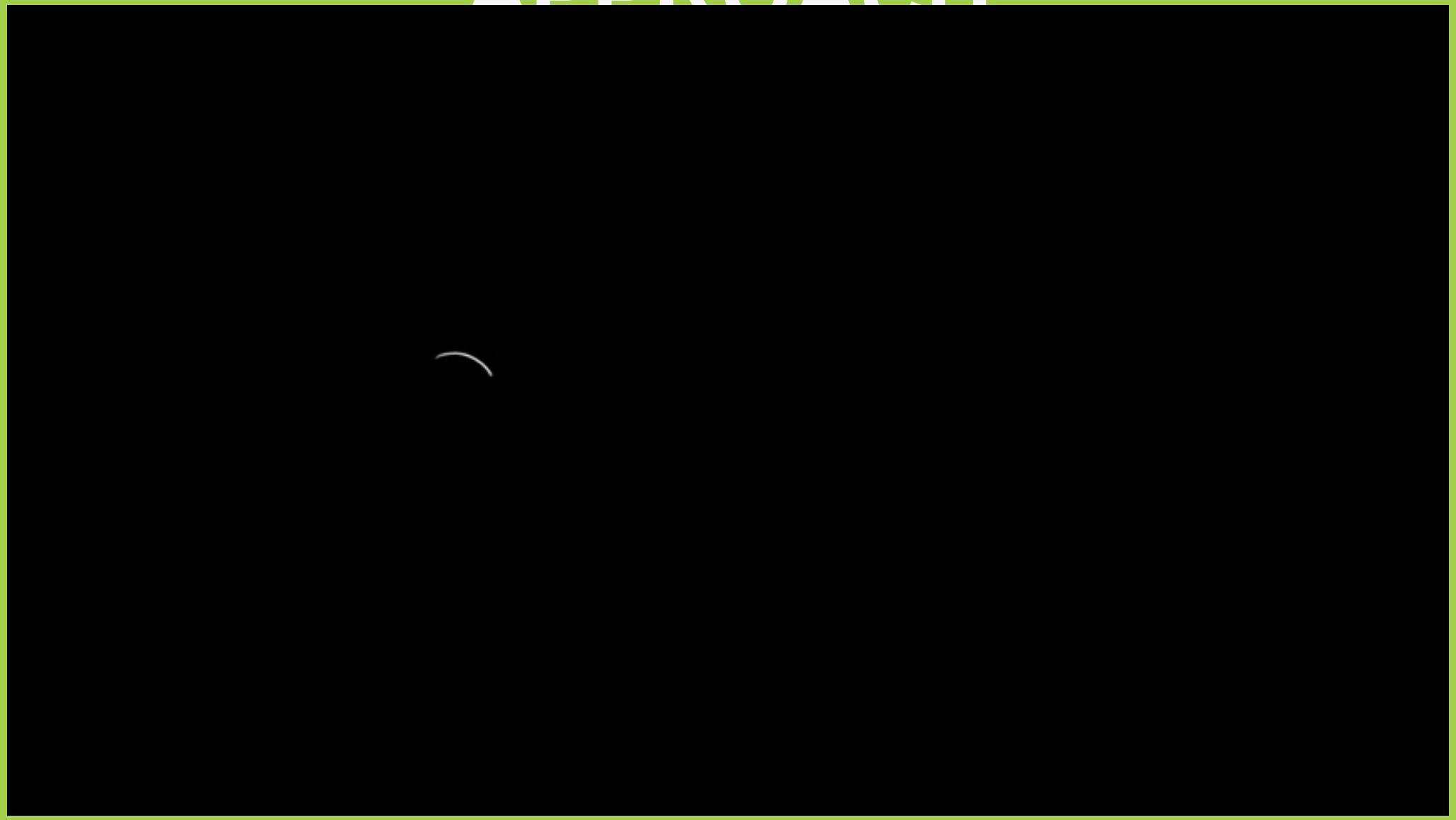
Switch with the person next to you

Therapies

Goals of Rehabilitation: NEUROPLASTICITY

- Strengthen and restore function to neurological systems
- Teach adaptive strategies for systems we cannot repair
- Diet and nutritional strategies to support cell metabolism and minimize risk of 2ndary issues

THE EQUINOX WELLNESS APPROACH



Remapping Visual Stability

Visual perception is based on both incoming sensory signals and information about ongoing actions. Recordings from single neurons have shown that corollary discharge signals can influence visual representations in parietal, frontal and extrastriate visual cortex, as well as the superior colliculus (SC). In each of these areas, visual representations are remapped in conjunction with eye movements. Remapping provides a mechanism for creating a stable, eye-centred map of salient locations. Temporal and spatial aspects of remapping are highly variable from cell to cell and area to area. Most neurons in the lateral intraparietal area remap stimulus traces, as do many neurons in closely allied areas such as the frontal eye fields the SC and extrastriate area V3A. Remapping is not purely a cortical phenomenon. Stimulus traces are remapped from one hemifield to the other even when direct cortico-cortical connections are removed. The neural circuitry that produces remapping is distinguished by significant plasticity, suggesting that updating of salient stimuli is fundamental for spatial stability and visuospatial behaviour. These findings provide new evidence that a unified and stable representation of visual space is constructed by redundant circuitry, comprising cortical and subcortical pathways, with a remarkable capacity for reorganization.

VESTIBULAR THERAPY FOR PARKINSON'S

- Vestibular rehabilitation (VR) is effective at reducing the symptoms and signs of Parkinson's Disease.
- VR can reduce incidence of falls
- VR can reduce frequencies of orthostatic hypotension
- VR can reduce square-wave jerks (SWJ)
- VR can improve spatial orientation
- VR can reduce tremor frequency and amplitude
- VR can reduce rigidity associated stiffness and pain

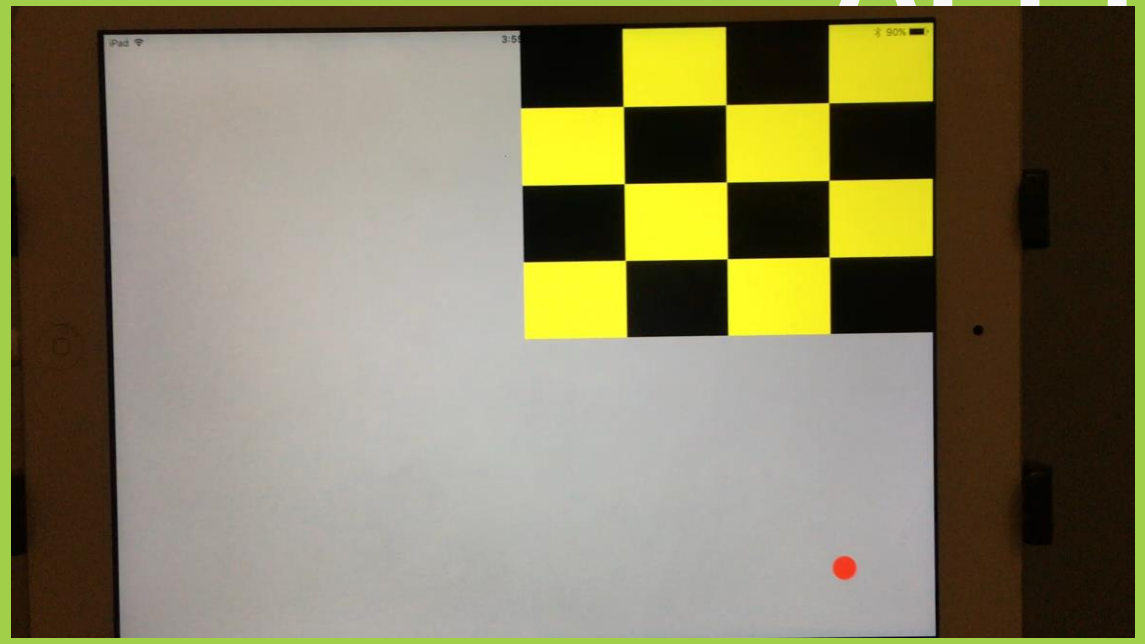
Ahmet A, Karapolat H, Is customized vestibular rehabilitation effective in patients with Parkinson's, NeuroRehabilitation, vol. 37, no. 2, pp. 255-262, 2015

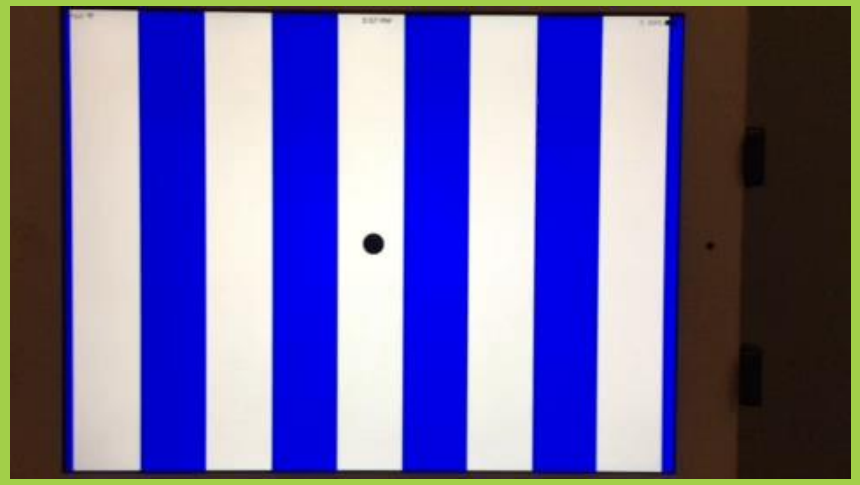
VAGUS NERVE STIMULATION FOR PARKINSON'S

- Vagus Nerve Stimulation (r-VNS) is effective at reducing the anxiety and stress associated with Parkinson's Disease.
- r-VNS can reduce Heart Palpitation
- r-VNS can improve locomotion
- r-VNS can improve Brain Blood Barrier integrity

FARRAND, AQ; et al. Vagus nerve stimulation improves locomotion and neuronal populations in a model of Parkinson's disease. *Brain Stimulation*. United States, 10, 6, 1045-1054, Nov. 2017.

THE EQUINOX WELLNESS APPROACH





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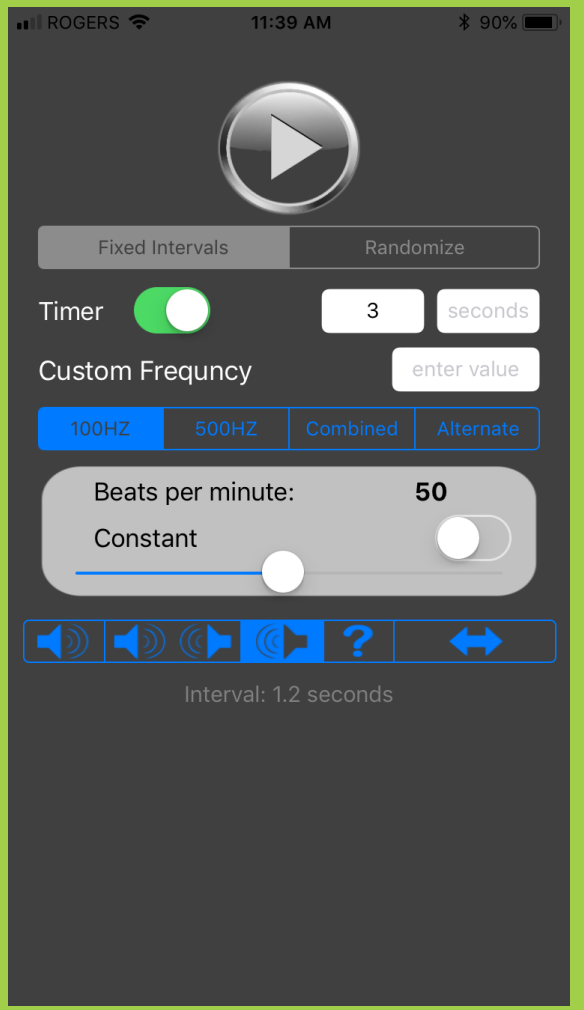

SUMMARY

- Parkinson’s is a prevalent neurodegenerative disorder
- First signs: Shoulder pain and stiffness, neck tightness, constipation, balance loss
- Tremor is the last sign to appear, and doesn’t have to appear
- Therapies for PD should be directed towards cerebellar, vestibular, spinal, and eye movements.
- Specific areas can be triangulated through examination and testing.
- Functional Chiropractic Neurology Approach could offer a multi-modality approach to improve the QUALITY OF LIFE of PD patients.

EQUINOX

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